

September 18-24 1987

Vol 6 No 37 60p

POPULAR Computing WEEKLY

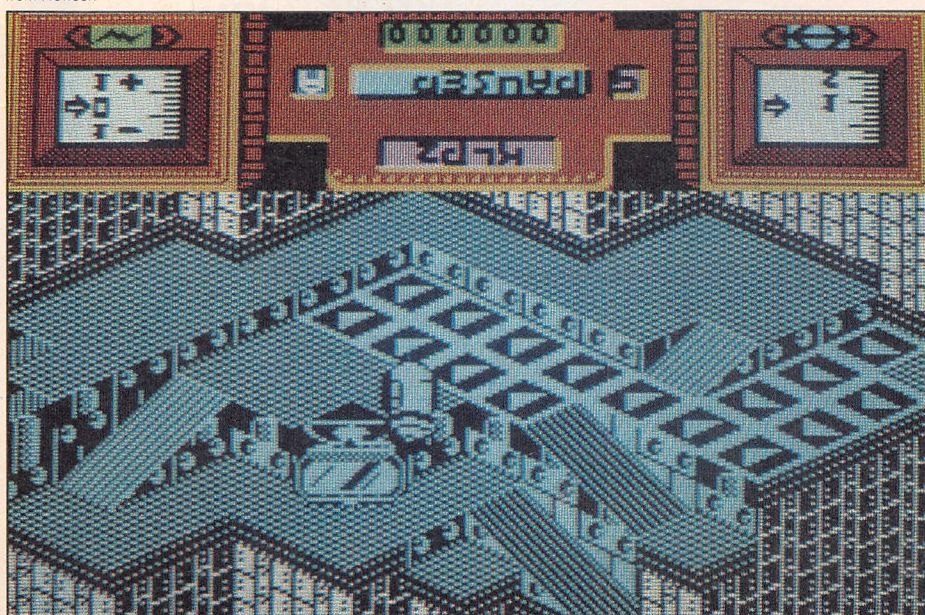
PCW Show Preview

New hardware
and software
at the year's
mega event



Magnitron
from Hewson

Space Ranger
from Microprose



NEWS DESK

Acorn loss
announced

A500 deal
extended

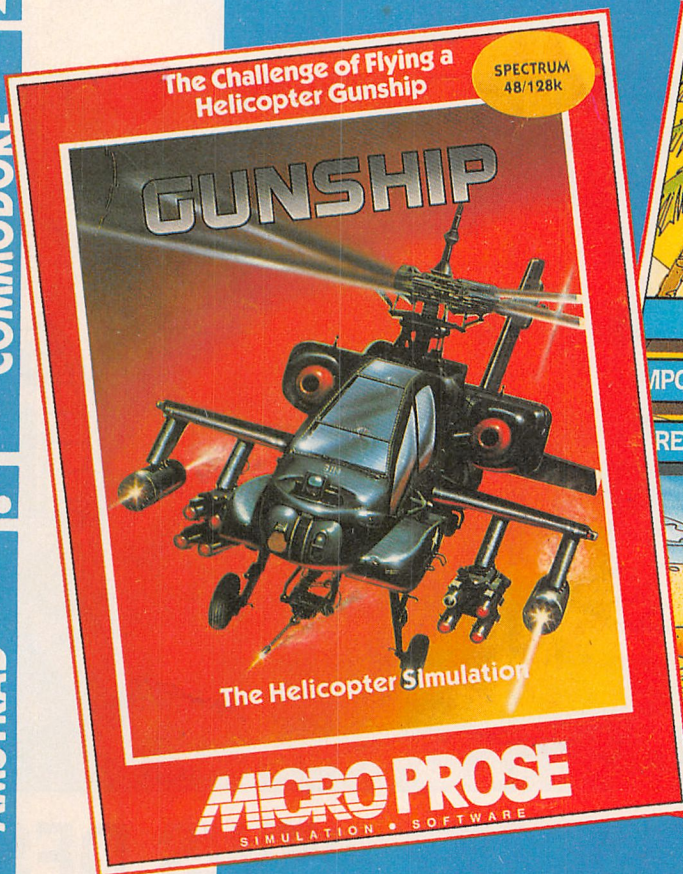
NEW RELEASES • COMMUNICATIONS • COMPUTER MUSIC

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NEW RELEASES



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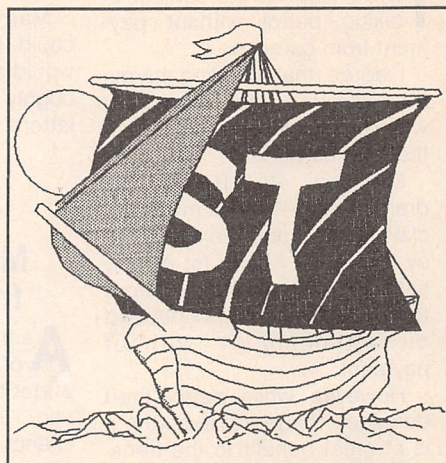
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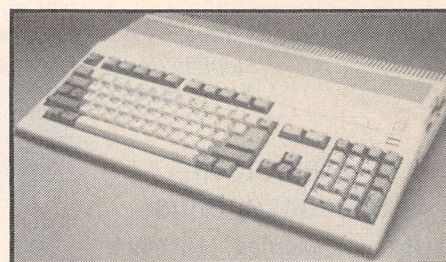
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14 PCW Show preview We look forward to what, not surprisingly, is known as "the main event". In the first part of our guide, we look at who is going to launch what!



Top: *Easydraw 2*. Second: PCW 9512, unveiled at next week's PCW Show. Above: A500 Still on offer. Below: *Renegade*

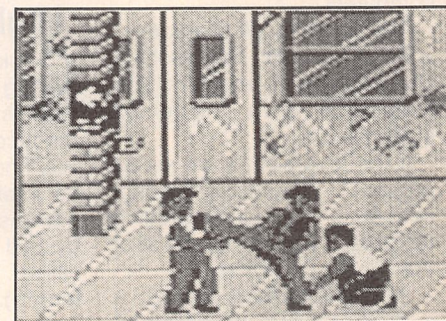
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The Rolls-Royce morality

I am writing on the subject of taking petrol without payment from garages.

I agree that stealing harms the industry and is morally wrong but there is not much that can be done.

My new Rolls-Royce has drained almost all of my financial reserves, and the little money I have left I need for oil and servicing. I simply cannot afford to buy petrol and must depend on obtaining it without payment.

However, while petrol theft damages the petrol industry, it is of great benefit to the transport industry as a whole. For example, I would not have been able to upgrade my Mini to a Rolls if all my money had gone on petrol.

The above, which is what Russell Wallace wrote, should leave no one in doubt that we're talking about theft.

I am disturbed by the consequences of software piracy as it makes theft seem less serious, and blunts the moral sensibilities so much that it does not seem like theft.

*Stephen Batey
Hove, Sussex*

Memotech misconceptions

As a dedicated Memotech owner and user for a number of years, I felt I had to write and clear up a couple of misconceptions about Memotech computers.

The "missing left characters" is not a fault with the machine. Unlike many computers, the Memotech uses the entire screen width.

If the television is not set up properly - the screen is not central, or the picture width is too great - you will not get all of the picture on screen.

All that is normally required is a simple adjustment of the horizontal hold and/or the picture "width" control of the TV.

A second common complaint is that when plotting circles you get an ellipse.

This is true but is not the fault of the machine, but because the programmer does not understand how the visual display processor works.

Like many computer systems, the Memotech produces pixels which are not "square".

To produce a circle requires that the programmer includes an aspect ratio of horizontal to vertical measurements.

Many of these problems could be overcome if people would read their manuals thoroughly before writing outraged letters to magazines.

*Richard Knight
Penhill, Swindon*

More sparks fly from Sparklers

As the author of *Little Al*, one of the games published under the Sparklers label, I was very interested to see Bob Branchley disputing the rights to some of the titles (Vol 6 No 35).

I supplied my game to Mr Branchley when he was trading as Essential Consultants and have a royalties agreement signed by him.

As yet I have not received a penny for all my hard work, and in fact I did not even know the game was out until I saw a copy in the shops. I then phoned Mr Branchley who claimed that it was nothing to do with him.

As he now seems so keen on arguing about what's right and wrong with his deal with CSD, perhaps he might give some thought to the people who provided him with the software in the first place, and pay us what is due.

*Neil Latarche
Hockley, Essex*

People who live in glass houses...

Could you please stop printing letters informing the readers of yet another home-produced magazine. They are very boring and are not trying to be interesting but just a free advertisement. I myself produced a free magazine called... (letter edited for length).

*Catherine Redgrave
Salford, Manchester*

Suffering

I too am suffering from the same Memotech problems as your correspondent M J Burrows.

It's akin to buying a set of dining chairs with one leg shorter than the others and being told: "It's just a quirk of



"I don't think we have anything that can help Acorn!"

our furniture, when lunch is served all you will need to do is put four of our housebricks under the short legs. By the way, this may or may not work."

Surely offering any product for sale implies that the products will perform to specifications - in this case the manual - which it certainly does not. Or am I being silly in thinking that the computer industry conforms to normal trading standards?

I look forward to possible rectification tips from your readers.

*K Dawson
Spalding, Lincs*

The price we pay for piracy

If Mr Wallace has the financial resources to purchase an Amiga 500, surely he expects to buy software for it.

I think his excuse is pathetic. It seems that he was relying on friends to supply him with copied software when he bought his Amiga.

It is irresponsible people like Mr Wallace who ensure that Amiga owners (and I am one) continue to pay a high price for software.

*C B Morgan
Croydon, Surrey*

Compunet costings

In response to the letter from W M Barry (Vol 6 No 34 - The Ups and Downs of Compunet), I

cannot accept that my article was inaccurate.

The new off-peak access charges to Compunet were clearly stated with all of the relevant facts. W M Barry merely repeats them.

Anyone using Compunet for more than 200 minutes per quarter can apply for the unlimited free off-peak connect option, and the cost of off-peak connect will be lower.

I am always open for constructive criticism of any factual errors in my articles and welcome them either via these pages, or direct to me on Email: Cnet GE81, Prestel 213739079, Telecom Gold 72:MAG60070.

*Graham Edkins
Perry Barr, Birmingham*

CPC toolkits for sale

Many people have written to me asking if I could supply my programs Xen and Icon Toolkit (for the Amstrad CPC micros) on EPROM/ROM.

I am happy to say that this is now possible. The EPROM, which works on most standard ROM boards, contains Xen, Icon Designer and Icon Toolkit.

The cost is £8 from Andrew MacPhee, 10 Bayview Crescent, Little Oakley, Harwich, Essex CO12 5ED.

Ask for the Xen/Icon Toolkit EPROM. Andrew also runs a transfer service to transfer any program (Basic or machine code) to EPROM provided that copyright is not infringed.

*Simon T Goodwin
Middlesbrough, Cleveland*

Bleeding hearts, bleeding cheek

So poor Russell Wallace "cannot afford to buy software" and "must depend on... pirate copies".

How my heart bleeds. In effect, he is saying that if you can't afford what you want it's perfectly OK to go out and steal it.

Presumably if he runs out of money he has to depend on mugging old ladies.

What a wonderful society we would live in if everyone had his attitude. What a shame you didn't print his whole address. I, for one, would love to pass the details on to FAST.

*Caroline Pickering
Downs Barn, Milton Keynes*

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PCW1

Amiga offer goes till 30 September

COMMODORE has announced an extension to its money-off deal on the A500 Amiga and 1081 monitor – as predicted in *Popular Computing Weekly* (see News Desk, September 4).

The scheme, which gave vouchers worth a total of £200

off joint purchases of the A500 and the monitor, was due to end last week.

But demand for the A500 under the promotion was so overwhelming that the offer will continue until the end of the month. This follows repeated denials that such a move was



A500 – still on offer

likely – so a permanent price cut is more likely than ever.

"The promotion has been a fantastic success, with customers calling to congratulate us," said Commodore UK Consumer Division sales chief Tom Hart last week.

"As we haven't seen any

trailing off of demand yet we believe we need to extend the promotion to the end of the month to avoid customer disappointment," he added.

But Commodore was sticking to its guns on the issue last week, and a spokesperson denied any cut was due.

Low-end PS/2 model

THE IBM PS/2 entered yet another chapter of its brief but turbulent history with the announcement of a new model for the US market, the PS/2 Model 25.

Although IBM have, as usual, denied that the machine will be released in the UK, there has been some speculation that it might be seen at the recently announced IBM show later this year.

In simple terms, the Model 25 is a much reduced (both in size and price) version of the Model 30. Designed fundamentally for the educational sector, the main change from the other PS/2 computers is that the Model 25 will not be sold configured with a hard disc, although one of its two full size expansion slots could be used for a hard card.

Those who consider it strange that only five months after the announcement of the range of computers which, by their own admission, was supposed to be all things to all users, will not be surprised to learn that IBM have also made changes to the 80386 based Model 80.

With prices starting from US\$1300 for the new Model 25, understandably most people expect the Model 25 to be the first IBM to retail in the UK for under £1000.

Alexander to head new Virgin software and books outfit



VIRGIN continued the reorganisation of its publishing activities last week when it announced the formation of Virgin Publishing, a subsidiary of Virgin Vision.

The new company will explore "opportunities in multi-

media publishing", while continuing to handle the entertainment and travel giant's existing software and books operations.

One of Virgin Publishing's initial projects is an interactive video disc, designed to be used

in schools on the Acorn Domesday system with either an IBM PC or BBC. The project is a recreation of Sir Ranulph Fiennes' round the world trip, and is expected to be complete next year.

"Entertainment technology has already-developed a number of new formats in recent years and several more are already on the horizon," said Virgin Publishing managing director Nick Alexander, who moves from Virgin Games.

"Products like Compact Disc Read Only Memory bring together the different talents involved in print, computer software and video publishing, but even without new technology there are increasing benefits to be gained by looking at the suitability of many projects across different audio visual formats."

Acorn RISC hopes dashed by poor result

ACORN has announced a half-year loss for the period ended 30th June, despite the arrival on the market of the Archimedes RISC-based micros.

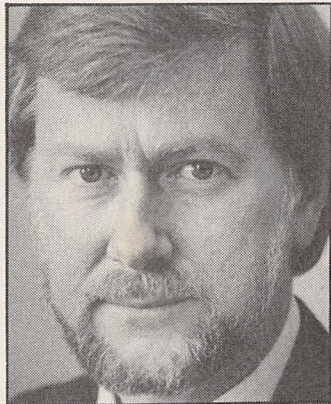
The net loss is £1.38 million, compared with a £310,000 profit for the same six months in 1986. Acorn managing director Brian Long said he was "disappointed, but not completely surprised" at the results, which are still affected by the heavy investment involved in bringing Archimedes to market.

"We knew that (Archimedes) would have a negative impact on sales of the Master and Compact," Long told reporters as he attempted to explain the poor showing.

"The second quarter sales for the industry in general seemed to be down, but in addition the budgeting procedures of local councils have been delayed this year, and our expenditure on new products has remained in the budget."

City sources were known to be far from happy at the £1.03 million profit posted for last year, and were expecting a marked improvement once Archimedes arrived.

The announcement of a loss



Acorn's MD Brian Long

means that full-year figures for 1987 have to turn round quickly if City confidence in the troubled Olivetti subsidiary is to revive. But Long was hedging his bets last week.

"December 31 of this year comes very early in the build-up cycle of Archimedes. The important thing is going to be to get the product properly into the market," he said.

"Certainly in 1988, if we aren't making money on this, then the investment will have been wasted," he added.

Acorn is expected to make additions to its family of RISC-based products next year.

4MB expansion board for IBM PS/2

AS MOST of the industry wonders what point there is to the PS/2 range without OS/2, Kudos Systems Ltd, a European distributor for the Everex range of IBM peripherals, has launched a 4MB high capacity memory expansion board, suitably called RAM 4000.

Designed to work with both the Model 50 and the Model 60, the RAM 4000 is one of the first products launched to actually use the much talked-about Micro Channel Architecture.

Mark Simon, managing director of Kudos Systems, said "The announcement is good news for IBM PS/2 owners since the OS/2 operating system will require a large memory size."

Quite how many PS/2 owners will buy RAM 4000 now, particularly with no OS/2 until mid '88 remains unclear, although the system is also compatible with most extended memory systems.

Contact Kudos on 01-200 6511.

SOFTWARE HOTLINES

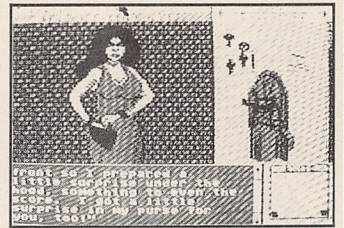
Had an interesting chat with Greg Follis of **Gargoyle Games** and **FTL** recently. It seems that the two labels won't be represented at the PCW Show this year. Why not, you ask?

At the moment the Carter-Follis partnership is doing a number of programming jobs for other software houses, including *Thundercats* which is planned as one of **Elite's** big autumn releases (and which will be at the show).

I've seen a couple of screen shots of the game, and it's got that distinctive Gargoyle style of graphics that you all remember from *Tir Na Nog*, *Marsport* etc. But this time, Greg says it's a pure arcade game, "the sort that will break your joystick". It uses the Lasermation technique which allows the game to use large animated sprites without any of the usual Spectrum colour clashing problems, and the 128 version includes digitised pictures.

Speaking of things being hush-hush, I've got sitting in front of me a copy of **Mosaic's** *Yes Minister* game. Trouble is, I can't say anything about it because the game is subject to a non-disclosure agreement until after PCW, which is just the sort of bureaucratic nonsense that the game and series are supposed to be sending up...

The fetching little screen shot at the bottom of this column is from Tony Crowther's latest game, *Zig-Zag*, which is a sort of cross between *Zaxxon* and a maze game. The little shot above is **Mindscape's** *Deja Vu*, another of their mystery/adventure titles about which I know very little except that both games are due from **Mirrorsoft**



quite soon.

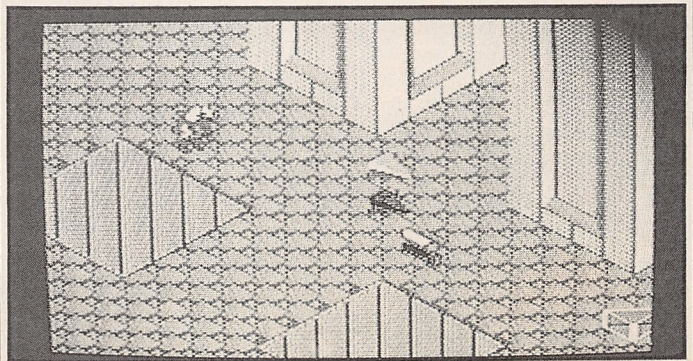
The last time I went into an arcade and found a game that I liked was when I discovered a jolly little swords 'n sorcery number called *Rastan*. This features a Conan the Barbarian type character who hacks his way across a mountainous valley in search of treasure. **Ocean** has licensed the game from Taito (that name again!) and the game should appear on C64, Spectrum, and CPCs in November.

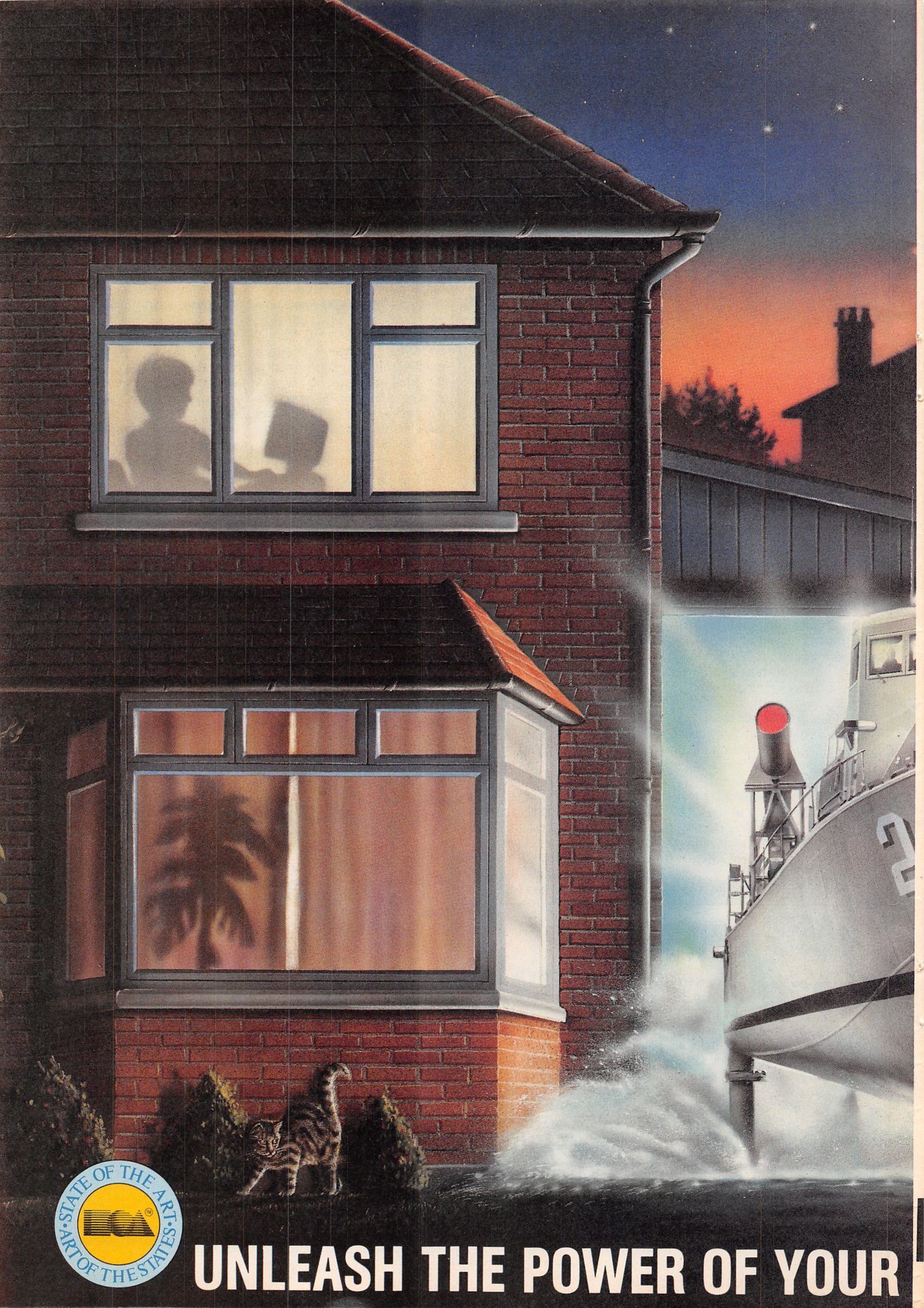
With autumn on the way a few stocking fillers are about to appear in the shape of some compilation tapes. Ocean have put together a pack of ten sports games, for release this month. *Game, Set and Match*, as it's called will contain more than twenty different events in all, including tennis, basketball, boxing, ping-pong and multi-event programs like *Supertest* and *Hypersports*.

Elite has got a second *6-Pak* compilation line up for release at about the same time, with *International Karate*, *Ace*, *Lightforce*, *Shockway Rider*, *Eagle's Nest* and *Batty* (Arkanoid clone).

Swedish outfit, **American Action**, is releasing a four-title compilation of 'action' games, and of course there's **US Gold**. The *Solid Gold* pack won't be out until November, but it includes the rather odd mix of *Gauntlet*, *Infiltrator*, *Ace of Aces*, *Leaderboard* and *Winter Games*.

Finally, US Gold has signed up an incredibly unlikely name for one of their Christmas licensed titles... (pregnant pause)... *James Dean*.



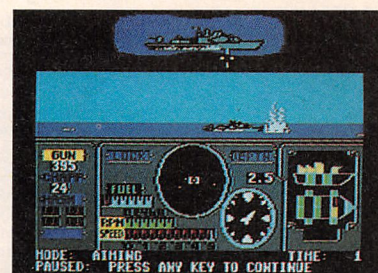


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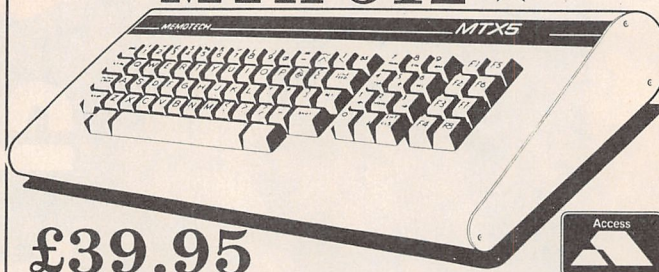
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Melbourne back again

MASTERTRONIC last week revealed that it will be relaunching the Melbourne House full-price label, which it bought last February.

Full details won't be available until next week's launch at the PCW Show, but it is known that ten titles will appear initially, including *Metropolis*, *Road Wars*, *Rockford*, *Pulse Warriors*, *Street Hassle*, *Kelly X*, and a conversion of *Lord of the Rings*, although that is not yet

completed.

All will be available on C64 and Spectrum, most will be on Amstrad, and five will be on Amiga and ST – but Mastertronic was not saying which ones.

"We've spent three months reconsidering the full price market," said Marketing Manager Rachel Davies. "In order for Melbourne House to succeed, we need to set higher standards."

Mastertronic will have five hands-on games at the show, with a further five demonstration screens.

The company has also signed up the rights to the Ultimate And Ricochet ranges, via US Gold, and will shortly be re-releasing a number of Ultimate titles at £1.99.

Right: Rachel Davies, Marketing Manager at Mastertronic



'Hand of God' game

BUG BYTE has announced two new games, *Defcom* and the improbably-named *Peter Shilton's Handball Maradona*.

Defcom is a Strategic Defense Initiative shoot-'em-up featuring a fighter plane fitted with a laser. The object of the game is to regain control of earth's satellite system.

Peter Shilton's Handball Maradona is based upon the so-called "unforgivable" hand of God incident during last year's World Cup. The user plays the part of Peter Shilton, faced by players in practice session, league matches and multi-player games.

Defcom costs £2.99 on C64, 48K Spectrum and Amstrad CPC, while *PSHM* is available on C64 and 48K Spectrum only at the same price.

Comms for IBM PCs

FREEWAY is a new communications software package about to be released for IBM PCs and compatibles.

Supporting all major terminal types and protocols, the package uses a system of pop-up menus, making it simple to use. The package comes in two versions: *Freeway* and *Freeway Advanced*, costing £99 and £195 respectively.

More information from Kortex UK on 01-831 1106.

Happy birthday

SIMULATION specialist Microprose Software has just marked its first year of operation in the UK, with plans going ahead for future expansion.

The company now has a staff of forty at its headquarters in Tetbury, and has just purchased a 15,000 square foot warehouse to house the operation.

Microprose has also taken on

board a wide range of products from Origin Systems, Springboard, and Suncom which cover the whole range of hardware, games and office accessories.

Company founder Major "Wild" Bill Stealey started the celebrations with a birthday cake in the shape of an F15 jet, after the success of their F15 flight simulator.

More for PCs

LIFETREE Software will be sharing a stand with Allders, the department store at this year's PCW show.

The company will be exhibiting their range of business packages for IBM PCs. These include *Volkswriter 3* and *Volkswriter Deluxe*, as well as the *Words and Figures* spreadsheet and *Learn To...* series of programs.

It's not clear what Allders will be exhibiting, but if you ring 0494-772422 you may find out.

New strategy title from Origin

ORIGIN has announced the imminent release of *Ogre*, a strategy game set in the "scarred nuclear battlefields of the 21st century", according to Ray Evitts, the product manager at Origin.

Based on a classic strategy

What Crysiss?

CRYSYS is a new software label to be launched in October by the company Software Publishing Associates.

Its first title will be *Phantom*, for the Spectrum, but manager Leigh Richards says that Crysiss will be launching six new titles during 1988, across the whole range of eight and sixteen bit machines.

DIARY DATES

SEPTEMBER

23-27 September Personal Computer World Show

Olympia, London

Details: Latest hardware, software and peripherals for business and leisure computing

Price: £3, £2 – (parties over 10)
Organiser: Montbuild
01-486 1951

OCTOBER

15-17 October Desktop Publishing Show

Business Design Centre, London

Details: Demonstrations of latest hardware and peripherals, plus seminars and user clinics

Organiser: Database Exhibitions, 061-456 8383

NOVEMBER

14 November National Einstein Exhibition

National Motorcycle Museum, Birmingham

Details: Einstein software etc.

Price: 50p

Organiser: UKEUG (0473) 49507

Prices, dates and venues of shows can vary, and you are therefore strongly advised to check with the show organiser before attending. We cannot accept responsibility for any alterations to show arrangements.

NEXT WEEK

Daisy, daisy

As Alan Sugar prepares for the PCW Show, we take an exclusive look at his newest machine, the PCW 9512.

Not just another preview, our test will reveal all the good, and bad, points of this new look Joyce.

Cost cutting

Next week we look at ways of cutting your phone bills – without getting arrested!

Steve Gold, a man with substantial phone bills of his own, has been examining the Mercury Communications system – the only real alternative to British Telecom – and his resultant savings will be of interest to us all.

The main event

Anyone interested in the computer industry will know that the 23rd of this month sees the beginning of the 10th annual PCW Show.

In the second of our features on this show, we will publish a full floorplan to help you through the maze of stands, as well as telling you about any new developments.

One day my prints will come

Chris Jenkins, our resident print expert, looks at one of the best of the new generation high quality dot matrix printers, the Panasonic KXP-1083.

Many hands make light work!

POPULAR Computing Weekly has two new pairs of hands at the helm as of last week. News editor John Brissenden has be-

come deputy editor, while Francis Jago, former editor of Which PC? takes over as executive editor. The moves follow the

announcement that editor Christina Erskine and managing editor Peter Worlock have left to work freelance.

Barbarian banned for "inciting violence"



PALACE Software's hit game *Barbarian* has been banned in Germany because of the realism of its violent swordfighting action.

The decision was made by the Bundesprüfstelle Für Jugendgefährdende Schriften, a government department responsible for monitoring publications that may 'endanger' youth. In a letter to Palace, the German Government stated that it felt the realism of the violence – which includes a decapitated head bouncing across the screen – was sufficient to incite young people to violence.

Palace Managing Director,

Peter Stone, told *Popular* that he was "quite sad" at the decision.

On the issue of the game inciting violence he said:

"That's a point of view I couldn't agree with. If I did, we would never have released the game in the first place."

While the game has not been completely banned, retailers will not be allowed to display it or sell it to anyone under the age of 18.

Despite this, Palace are continuing work on ST and Amiga versions of the game, and a number of US companies are currently bidding for the American distribution rights.

Give your ego a BOOST

MICROPRO last week announced a couple of memory-resident PC software products, and also announced a number of promotions to celebrate the forthcoming sale of the 3,000,000th copy of its best selling *WordStar* word-processor.

BOOST is a program which runs in background with whatever other application software is being used, and provides reminders, date, time, world clock, date stamp, address book and calculator, rather like Borland's *Sidekick*.

In addition, it enables pre-set items such as name and address, date and salutation for letters to be sent to a word-processor screen with the use of two "hot keys".

Graph-in-the-Box aims to provide simple but effective business-type graphics – graphs, bar charts, pie charts and so on.

Both products are designed to run on IBM PCs or compatibles. *BOOST* uses 52k RAM beyond that used by other application software, and runs on MS DOS 2.0 or later. It costs £39.95 inclusive. *Graph-in-the-Box* uses 128k RAM, and also runs on MS DOS 2.0 or later.

Bold move by APT

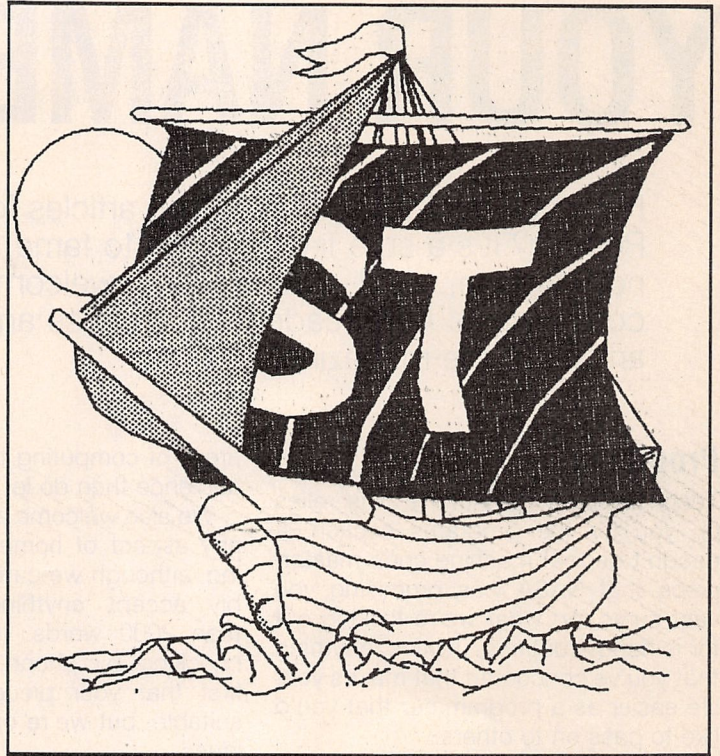
AVON Printer Technology have produced a hardware upgrade for the Commodore MPS803 printer which gives it a number of new facilities.

Printkit IV consists of two integrated circuits which, when fitted into the printer, allow it to produce bold print, single pass underlining and a new italic character set, as well as increasing print speed.

Enquiries to APT on 0272-736555.

Quick on the draw

Easy Draw 2 has been updated, but not as much as it could have been. Roger Howarth draws his own conclusions.



This year has already seen the launch of two impressive desktop publishing packages for the Atari ST, and perhaps as a response to this, or simply as part of the quest for perfection, Electric Software has released *Easy Draw 2*.

Essentially an enhancement of *Easy Draw*, (reviewed Vol 6 No 4), *Easy Draw 2* is being sold for £79.95, or as an upgrade to *Easy Draw* owners for £24.95, or reduced still further to £14.95 for members of Electric's "Softline" user support group.

The package can also be upgraded with the purchase of two new fonts, called Hi-Tech and Rocky, each costing £89.95.

A few small changes have been made to the program's operation: most menu commands are now duplicated on the keyboard which makes using the program noticeably quicker, and a few extra text sizes are available, although the original maximum and minimum limits still remain. Object manipulation has been improved with facilities such as flipping and mirror imaging and a metric ruler has been added to the original imperial one. But on the whole these facilities pale in the shadow of the new text functions...

Text

Operationally the new text functions are quite simple, but the effect they have on the program is quite stunning. Text files can be imported from disk directly into special text objects and once inside, these can be split up into manageable chunks which can be re-shaped and moved around, and treated with a variety of text effects.

These effects are the same as those in *Easy Draw*, namely the GEM standards of underline, bold, light, italic and outline. The text sizes vary from 7 point (less than $\frac{1}{8}$ inch) up to 36 point ($\frac{1}{2}$ inch) in 6 steps. Inevitably one would like infinite variation in

everything, but in reality there is sufficient variety here for most needs.

There are two modes of text justification. The one that I suspect will be used most of the time is "justified", which aligns text to both left and right margins by proportionally spacing the letters rather than simply inserting spaces between words as on a typical word processor. This system gives a very neat appearance in all but the most awkward of situations.

The other mode is "unjustified" and is as simple as it sounds, although one point that may upset people more used to computer output than type-set material is that even in unjustified mode the characters are always proportionally spaced.

Printing

The printer drivers are much the same as version one of *Easy Draw*. Suffice to say that as long as your printer obeys Epson codes you should experience no problems. Drivers are also available for Epson - compatible 24 pin and HP Laserjet printers direct.

However, as a 9-pin dot matrix printer has

a greater resolution than the hi res screen, pictures will be even sharper on print than they are on screen.

Verdict

Without wishing to belittle the usefulness of the many small enhancements made to the graphics functions, the area of significant improvement over version one is in the text handling, which although operationally simple, greatly increases the usefulness and appeal of what has always been an excellent product.

For those wishing to expand *Easy Draw 2* with extra fonts or printer drivers, splashing out £20 and joining Softline may well prove profitable. Ironically, the only real grumbles I have are associated with the text features, namely the limited range and expense of additional fonts and the limited output facilities. Here the inclusion of Postscript format files would have set this program apart from its competitors. As it stands there is no easy way to typeset the output apart from going via a printer, which will obviously limit the final quality. Having said all this, version 2 can still be highly recommended.

Below: Text on *Easy Draw 2*

Here is an unjustified block of text, with a ragged right margin..

And here is a justified block of text with a clean right margin.

Note how some words can become unnaturally stretched.

YOUR NAME IN LIGHTS

Have you ever thought of writing articles for Popular? It's a sure fire passport to fame, if not fortune, and we always welcome contributions from readers for features and articles in the magazine.

Programs

Technical editor Duncan Evans relies on you for the programs section. It needn't be that machine code masterpiece that NASA was promising you vast sums for, what we're looking out for is handy routines, utilities, anything that you've concocted that makes your life easier as a programmer that you'd like to pass on to others.

Don't make your programs too long, please – it's best if we can print the full listing in one week, and a four part listing is probably the largest we can accept. If they're very short, then so much the better, they'll fit neatly into our Bytes and Pieces page.

Features

We're also particularly interested in articles about programming, which should be sent to Christina Erskine. If you think you could explain technical

areas of computing to a wider audience then do let us know.

We also welcome articles on any aspect of home computing, although we cannot feasibly accept anything longer than 2000 words. It's worth checking by phone or letter first that your piece will be suitable, but we're open to all ideas.

Money no object?

If it's not the money you're interested in so much as simply having your say, the Ziggurat slot is where anyone can get up on a soap box and air their opinions. Your article should be 600–650 words long. We pay £15 per Ziggurat published.

For even less money, we'd like to hear your views, comments and opinions on our Letters page, and our columnists are always on the look-out for hints and tips and comments on their own areas of the magazine.

Mark Jenkins welcomes correspondence of a musical nature for Soundcheck, Martin Bryant is interested in any queries or views regarding computer chess, and our communications correspondents will be happy to answer questions about modems and networks (mark your envelope 'Comms').

Any technical or programming problems you're encountering can be addressed to Kenn Garroch. Kenn tries to help as many people as possible in Peek and Poke, but cannot undertake to give personal replies.

How to submit

For features, it is almost always

better if you write or telephone first to discuss your ideas with us. Your articles should be typed or word processed, preferably in double spacing, using one side of the paper only.

Please don't write more than 2000 words for an article. Program notes should explain what your program achieves and how it works, but, again, please keep them concise.

Payment

Listings will be paid at a rate of £25 per published page, Bytes and Pieces at £10 each. For feature articles, we pay £40 per published page, which is about 800 words.

Your payment should arrive six weeks after publication date.

Where to send them

All submissions should be sent to *Popular Computing Weekly*, 3rd Floor, Greencoat House, Francis Street, London SW1P 1DG. If you mark which department your letter is destined for on the envelope it will help us process them much more quickly.

We will make every attempt to acknowledge receipt of your submission.



It's showtime

The Personal Computer World Show, the biggest event in the computing year, returns for the tenth time next week. To whet your appetites John Brissenden and Cliff Joseph look ahead to some of the coming attractions.

Next week sees the tenth *Personal Computer World Show* at Olympia, and as usual *Popular* will be covering the show in full.

This annual jamboree has become the crucial event for the entire personal computing industry, and over the next three weeks we will be describing in detail what will be going on, and reporting on the inevitable surprises in store.

This week we start off with a sketch outlining the major items you can expect to see at Olympia. PCW has become a traditional occasion for announcing new products, exhibiting new products previously announced, and even showing new items which won't be available for several months.

This year's show is no exception. On the hardware side, most major manufacturers have had a busy year already, and there will be a few new items on show.

But the show will be the first time such a comprehensive array of this year's big machines – ST, Amiga, Z88, Archimedes, and others – will have been assembled.

In addition, scores of smaller companies will be using the show as an ideal opportunity to launch all manner of peripherals, too numerous to outline here.

Meanwhile the software houses have done just the reverse. The general trend seems to be to keep their heads down all summer, and then announce a plethora of new items at PCW. Only problem is, a lot of them won't be on sale for weeks or even months.

Hardware

In many ways, this year's *Personal Computer World Show* is more of a resumé of this summer's new products – at least as far as hardware is concerned. All the major manufacturers have launched new items onto the market since the spring, and so next week's festivities at Olympia will largely be a first only in that it will be an opportunity to see them all together for the first time.

That's not to say there won't be any surprises. Amstrad for one is planning no less than 21 product launches between now and the New Year, and so we could be seeing something new next week. The 80386-base AT clone is what a lot of people are keeping their eyes peeled for – but that's more likely to stay under wraps until next February's *Which Computer? Show*.

Atari's ST range was completed earlier

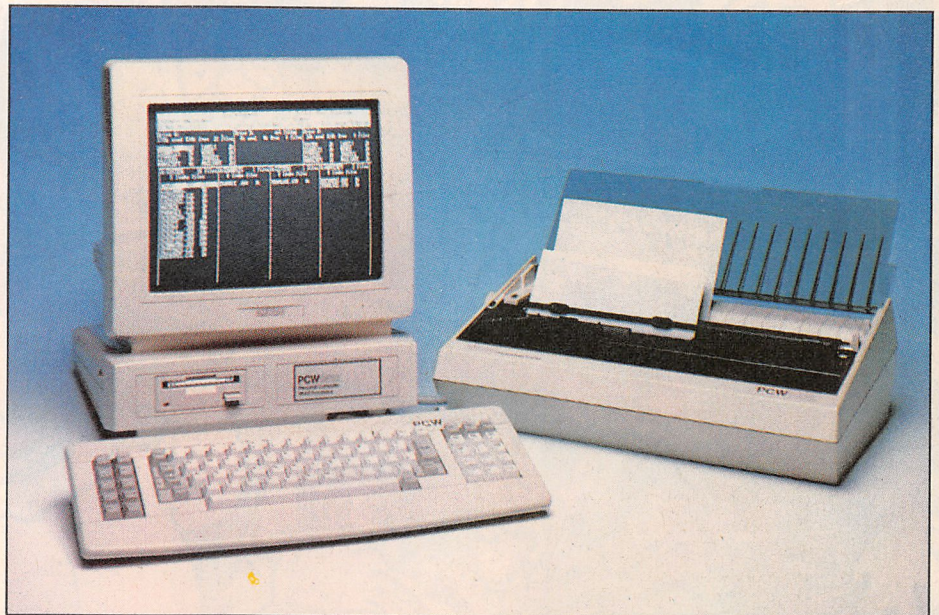
this year with the Mega STs, Commodore's A500 Amiga has been on the market for several months, Acorn's Archimedes got its first public airing at the Acorn User bash, Amstrad's PC1640 and Spectrum Plus 3 are already in the shops, and even the Z88 has finally appeared in Dixon's. With such a busy summer, will there be anything new at the show?

order. Finally an ST desktop publishing package – *Lazer* – will be available, price £99.95.

Robtek will be exhibiting a range of other ST and Amiga peripherals, including disc drives, sound digitisers and so on.

Software

Holding this year's show a little later than



Whatever else Amstrad might have up its sleeve, we will be seeing the new PCW9512 wordprocessor for the first time, and also the new LQ3500 printer.

Atari is one of two major hardware manufacturers which will have a whole area to itself, housing many smaller stands. So apart from the full ST range, the PC and games consoles, we can expect to see new add-ons and peripherals by the dozen, if not new computers.

Commodore has been in the news all summer following the launch of the A500 Amiga, but we can expect plenty of other things in the vast Commodore Village. Watch out particularly for the announcement of a sub-£500 PC compatible, which was originally first mentioned at the Hanover Fair in March.

Robtek is another company which will be catering for the ST, with a cartridge expander. This gives three switchable slots, and costs £49.95. There will also be a utility cartridge at the same price, which includes the ability to sort programs into alphabetical

usual has created a bit of a bottleneck in the summer software release schedules. The last month or so has hardly seen any important releases, but there should be a glut on show next week.

However, 'preview' is likely to be the name of the game in many cases, since much of this software is planned for release nearer Christmas and won't be finished or available until then.

Coin-op licensed games will be all over the place, with arcade machines standing in for unfinished conversions. A quick count shows that around half the coin-op conversions due for release this autumn are licensed from Taito, which must be raking money in with a shovel.

Ocean/Imagine will have *Renegade* (reviewed this week), *Psycho Soldier*, *Gryzor* and *Combat School*. They'll also have a few original games as well, including *Eco*, their first original 16-bit game.

Planned for the ST and Amiga, the game casts you in the role of an amoeba (type-cast again), which has to search for food

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Screenshots from Spectrum version



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PCW SHOW PREVIEW

through a series of scrolling 3D landscapes, as it attempts to climb the evolutionary ladder towards human status.

US Gold sounds like it's going to take over the show on its own. I can't mention half the stuff that will be on show but it includes; *Outrun* and *Gauntlet II* (both arcade machines and conversions), games based on Charlie Chaplin and Captain America, licensed games based on some new Mattel toys (the main one being *Bravestarr*, the successor to the Master of The Universe toys), the Mattel/Nintendo games machine, *Indiana Jones and The Temple of Doom*, *Impossible Mission II*, and just about anything else it's possible to take out a licensing deal on.

Firebird will have some coin-op machines to play with, too; *Flying Shark* and *Bubble Bobble*, both due for release on home machines very soon. The PC version of *Elite* should be there, and so should the massively delayed *Dark Sceptre* and *Star Trek*. They'll also have *Sidewize*, *Scary Monsters* and *On The Tiles*.

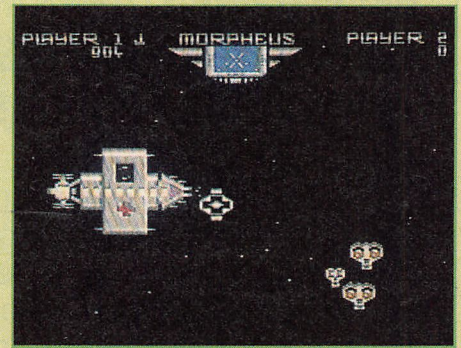
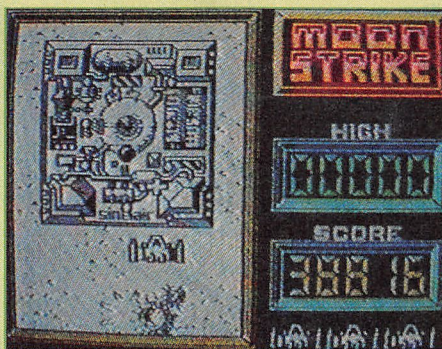
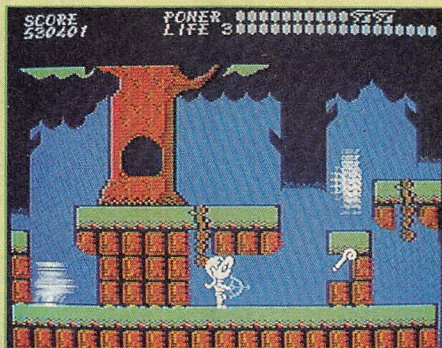
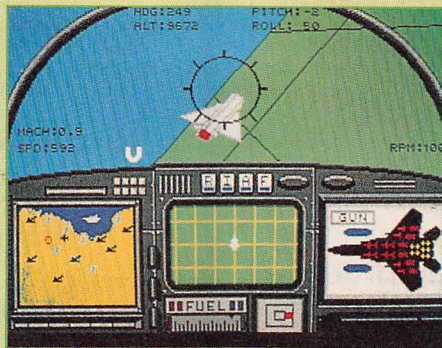
Not only are these three games good, they're also finished...

Softtechnics/The Edge will be previewing *Xecutor*, the first release on its new Ace label, and the first of the cuddly *Garfield* games, which is almost bound to be a hit just on the strength of the cartoon's following.

The Edge has paid its share of licensing money to Taito as well, and will be showing the conversions of *Darius* and *Soldier of Light*. This stand will also be showing the latest games from Ariolasoft, Starlight, and Reaktor, as The Edge now handles Ariolasoft's marketing.

Elite tells me it will be having a "very heavy presence" at the show, and let slip that it is following up *Paperboy* with *Buggy Boy*, and the 6-Pak compilation with *6-Pak Volume 2*. But the game I'll be looking out for on the stand is *Thundercats*, based on the toy/cartoon of the same name.

Designer software house *Domark* will be there of course. It is having a marquee rather than a stand, and will be playing host to luminaries such as Jeffrey Archer who is



puter versions of *Mah Jong* and *Casino Roulette* that will be on the CDS stand. *Mah Jong* is a totally baffling but spectacularly trendy oriental board game, and if you can master it then you're a better man than I am, Gunga Din.

One notable absentee from the ranks of 8-bit games companies is Gargoyle, but if you want to know what it's up to then go and read *Hotlines*.

This will be the first year when 16-bit machines and software are really likely to be out in force. We've seen them at shows in the past of course, but until now they've always represented 'the wave of the future'.

This year sees 16-bit as part of the mass market (you know a machine has arrived when the likes of Mastertronic is releasing budget software for it).

ST releases still outnumber Amiga ones by a large margin, but notable 16-bit exhibitors include Anco, Level 9, Robtek, Firebird, Rainbird, and Ocean/Imagine.

A must for 16-bit owners is the Electronic Arts stand. EA, possibly the top 16-bit house in the states, is making its show debut this year with a range of excellent titles; *Deluxe Paint II*, *Chessmaster 2000*, *Marble Madness*, *Bard's Tale* and many more. It is also converting many titles onto 8-bit machines and has taken on the distribution of games from CRL and Nexus.

Microprose another US company will also be there with its existing range, including the ST version of *F15 Strike Eagle*. And it will also have far and away the best 'arcade' machine to play with, in the form of a real flight simulator that will be running *Gunship*.

Looking beyond 16-bit, there will be one 32-bit machine on show this year, and the first day of the show will see the launch of the first Archimedes game, *Zarch*, from Superior Software. This developed version of this now famous London game, is written by one of the authors of *Elite*, and promises to be an interesting taste of what this year's 'wave of the future' is capable of.

The show is open to the public from Friday, September 25 to Sunday, September 27. Admission is £3.



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PROGRAMMING

The art of using a sound chip is to mix the available sounds and set up the various effects to produce the nearest approximation of the desired result. When trying to simulate a sound it is not only desirable to know what you're after in terms of what you hear, it helps to have an idea of what the sound looks like.

This may appear to be an odd concept

In the third part of his series on sound generation, Kenn Garroch looks at producing and analysing waveforms.

THE CREST OF A WAVE

but in practice any sound can be represented on paper or screen in graphical form. For example, a flute sound is very close to a sine wave (Fig. 1), and if a sound chip were capable of producing a sine wave, a flute is what it would sound like. Unfortunately, things are more complicated, and most musical instruments produce very complex waveforms. Fortunately, 'designer' waveforms can be output through virtually any sound chip with a little judicious programming.

Sound chips can generally produce frequencies from about 4kHz to 100kHz, the latter being way above the normal human range of 20Hz-20kHz. Sound chips also have volume controls that normally allow 16 levels of output amplitude to be set. Using the volume control and a very high frequency it is possible to use the chip to produce any desired waveform.

Example sound

Taking an example sound waveform, say the sine wave in Fig 1. If this is split into sections horizontally and the height of each section taken as its amplitude, setting these so that they are between 0 and 15 (simply multiply by 8 and add 8 since sine varies between -1 and +1), they can be used to control the volume level on the sound chip. A channel is then set to an inaudible frequency and the sine values are sequenced through and used to control the volume.

This causes the sound chip to emit the waveform, and its frequency is defined by the speed at which the volume levels are set. The drawback is that since the sine wave may be split into say 64 sections, to get a frequency of 440Hz (middle A on a piano), the volume level of the chip needs to be updated 440×64 times a second (28160 times a second or every 35 micro seconds). This means that the chip must be accessed at this speed, and the only way to do this is via machine code.

However, the programming is relatively simple and most microprocessors are fast enough to do it. To get more speed, simply decrease the number of sections (samples) that the wave is split into - the drawback is that this does decrease the accuracy.

To generate the waveforms, Basic pro-

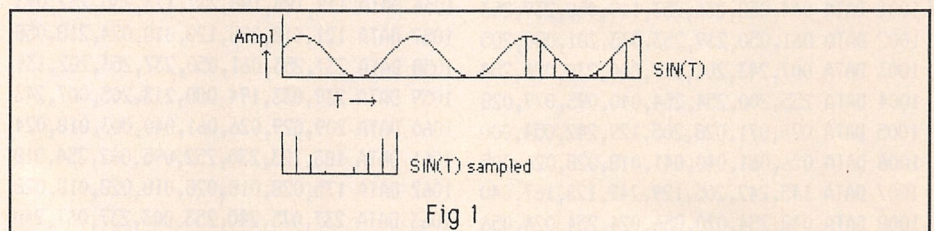


Fig 1

Fig 2 Harmonic program

```
10 PSET(0,0)
20 FOR t=0 TO 8*pi STEP .1
30 h0=SIN(t)
40 h1=SIN(2*t)/2
50 h2=SIN(3*t)/3
60 h3=SIN(4*t)/4
70 h4=SIN(5*t)/5
80 h5=SIN(6*t)/6
90 h6=SIN(7*s)/7
100 h7=SIN(8*s)/8
110 h8=SIN(9*s)/9
120 LINE -(t*10,(h0+h1+h2+h3+h4+h5+h6+h7+h8)*10+260)
130 NEXT
```

grams can be used, and a great number of sounds can be developed using sine synthesis. The program in Fig. 2 shows how the SIN function can be used to generate complex waves. Simply adding waveforms of different frequencies will give anything from a square wave (or near approximation) to a sawtooth. Try removing some of the H values, and leaving others in. A simple program such as:

```
10 PI=3.1415926
20 PSET (0,50)
20 FOR T=0 TO PI STEP.1
30 H0=SIN(T)
40 LINE =(T*20,H0*8+8)
50 NEXT
```

Shows a simple sine waveform. To get twice the frequency simply multiply the argument to SIN by 2 ie, 30 H0=SIN(T*2) for higher frequencies simply increase the multiplier. If frequencies are to be combined

as in the Fig. 2 program, the higher frequencies, ie, those multiplied, are known as harmonics. To stop them swamping the primary frequency, their amplitudes should be lessened by dividing them by a set value. This value determines how much of them you will hear in the final result.

The effect of combining different harmonics produces a square wave and ramp or sawtooth respectively.

To reproduce the sounds via the sound chip, set one channel to its highest frequency. Make up the desired waveform and sample it to values that will fit into the volume register for the particular channel. Place them in memory in sequence (an array), and then pick them up one by one and send them to the volume control, keep doing this and you will hear the tone. To change the pitch of the tone change the speed at which the samples are sent to the chip.

PROGRAMMING: SPECTRUM

Catacombs

P Fox

Finally, the remainder of the data listings for Catacombs. On each level the objective is to reach the stairs, and score by collecting treasures and zapping creatures. Strength and energy can be increased by collecting the food and bolts. To get through the doors you will need to collect keys, but beware of shooting these objects.

The keys are Z for left, X for right, O is up, K is down, P is fire and SPACE ends the game.

Up to twelve levels can be designed with the designer, which also provides a save/load subroutine. The keys are the same as above except that P toggles fill object, SPACE ends the level, 0-9 selects and object.

```
1 REM section 3
10 REM programming
20 RESTORE 1000: FOR c=60544 TO 62143:
READ a: POKE c,a: NEXT c
30 LOAD ""
```

```
1000 DATA 119,235,113,044,112,044,054,015
1001 DATA 044,058,236,253,119,058,239,253
1002 DATA 061,050,239,253,033,201,080,205
1003 DATA 007,243,201,017,000,230,026,254
1004 DATA 255,200,254,254,040,095,079,028
1005 DATA 026,071,028,205,129,242,054,000
1006 DATA 026,061,040,041,018,028,026,205
1007 DATA 145,242,205,129,242,126,167,040
1008 DATA 048,254,020,056,024,254,024,056
1009 DATA 018,254,056,056,016,254,072,048
1010 DATA 012,205,014,237,044,044,000,175
1011 DATA 119,024,002,054,000,123,230,252
1012 DATA 095,062,254,018,175,028,018,028
1013 DATA 018,028,018,028,123,167,200,024
1014 DATA 173,062,076,119,123,230,252,095
1015 DATA 121,018,028,120,018,028,028,028
1016 DATA 123,167,200,024,153,028,028,028
1017 DATA 028,123,167,200,024,144,033,000
1018 DATA 229,126,254,255,040,038,044,185
1019 DATA 040,014,060,185,040,010,061,061
1020 DATA 185,040,005,044,044,044,024,233
1021 DATA 126,184,040,014,060,184,040,010
1022 DATA 061,061,184,040,005,044,044,044
1023 DATA 024,215,045,201,033,000,000,201
1024 DATA 201,017,000,231,026,254,255,200
1025 DATA 254,254,040,104,079,028,026,071
1026 DATA 028,026,061,230,007,018,032,094
1027 DATA 028,205,228,242,230,003,167,040
1028 DATA 022,254,001,040,010,254,002,040
1029 DATA 010,005,040,216,005,024,010,004
1030 DATA 004,024,006,013,013,024,002,012
1031 DATA 012,205,129,242,205,164,242,167
1032 DATA 032,194,229,033,000,229,126,254
1033 DATA 254,040,012,254,255,040,006,044
1034 DATA 044,044,044,024,241,225,201,113
1035 DATA 044,112,044,054,004,044,054,000
1036 DATA 225,205,129,242,054,056,044,054
1037 DATA 057,001,031,000,009,054,058,044
1038 DATA 054,059,024,144,028,028,028,024
1039 DATA 139,017,000,229,026,254,255,200
1040 DATA 254,254,202,140,238,079,028,026
1041 DATA 071,205,129,242,054,000,044,054
1042 DATA 000,213,017,031,000,025,209,054
1043 DATA 000,044,054,000,028,026,167,202
1044 DATA 105,238,028,205,183,242,008,125
1045 DATA 254,008,048,019,008,229,197,018
1046 DATA 205,145,242,008,205,129,242,205
1047 DATA 164,242,167,193,225,040,009,205
1048 DATA 228,242,254,128,048,001,026,008
1049 DATA 008,230,003,018,205,145,242,205
```

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1050 DATA 129,242,205,164,242,167,040,044
1051 DATA 254,024,056,004,254,056,056,047
1052 DATA 123,230,252,095,026,079,028,026
1053 DATA 071,028,028,205,129,242,026,028
1054 DATA 135,135,198,056,119,044,060,119
1055 DATA 001,031,000,009,060,119,044,060
1056 DATA 119,195,188,237,123,230,252,095
1057 DATA 121,018,028,120,018,024,218,058
1058 DATA 237,253,061,050,237,253,202,139
1059 DATA 239,033,194,080,213,205,007,243
1060 DATA 209,029,026,061,040,003,018,024
1061 DATA 183,123,230,252,095,062,254,018
1062 DATA 175,028,018,028,018,028,018,028
1063 DATA 237,075,240,253,003,237,067,240
1064 DATA 253,033,208,080,213,205,247,242
1065 DATA 209,195,188,237,028,028,028,028
1066 DATA 195,188,237,054,000,058,237,253
1067 DATA 254,089,210,009,236,198,010,050
1068 DATA 237,253,033,194,080,205,007,243
1069 DATA 195,009,236,054,000,237,075,240
1070 DATA 253,033,010,000,009,034,240,253
1071 DATA 229,193,033,208,080,205,247,242
1072 DATA 195,009,236,054,000,058,239,253
1073 DATA 254,089,210,009,236,198,010,050
1074 DATA 239,253,033,201,080,205,007,243
1075 DATA 195,009,236,054,000,058,238,253
1076 DATA 254,099,210,009,236,060,050,238
1077 DATA 253,033,215,080,205,007,243,195
1078 DATA 009,236,058,238,253,167,202,009
1079 DATA 236,061,050,238,253,229,033,215
1080 DATA 080,205,007,243,225,126,054,000
1081 DATA 254,016,040,019,254,017,040,021
1082 DATA 017,032,000,254,018,040,020,167
1083 DATA 237,082,054,000,195,009,236,044
1084 DATA 054,000,195,009,236,045,054,000
1085 DATA 195,009,236,025,054,000,195,009
1086 DATA 236,006,008,033,000,088,126,230
1087 DATA 199,079,126,230,056,040,004,214
1088 DATA 008,129,119,035,124,254,091,056
1089 DATA 237,017,016,039,027,122,179,032
1090 DATA 251,016,224,006,008,033,000,088
1091 DATA 126,230,248,079,126,230,007,040
1092 DATA 003,061,129,119,035,124,254,091
1093 DATA 056,238,017,016,039,027,122,179
1094 DATA 032,251,016,225,201,058,242,253
1095 DATA 060,254,012,202,139,239,050,242
1096 DATA 253,033,087,080,205,007,243,209
1097 DATA 195,186,234,209,201,000,000,000
1098 DATA 000,000,000,000,000,000,000,000
1099 DATA 000,000,000,000,000,000,000,000
1100 DATA 000,000,000,000,000,000,000,000
1101 DATA 000,000,000,000,000,000,000,000
1102 DATA 000,000,000,000,000,000,000,000
1103 DATA 000,000,000,000,000,000,000,000
1104 DATA 000,000,000,000,000,000,000,000
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1105 DATA 000,000,000,000,000,000,000,000
1106 DATA 000,000,000,000,000,000,000,000
1107 DATA 000,000,000,000,000,000,000,000
1108 DATA 000,000,000,000,000,000,000,000
1109 DATA 000,000,000,000,000,000,000,000
1110 DATA 000,000,000,000,000,000,000,000
1111 DATA 000,000,000,000,000,000,000,000
1112 DATA 000,000,000,000,000,000,000,000
1113 DATA 000,000,000,000,000,000,000,000
1114 DATA 000,000,000,000,000,000,000,000
1115 DATA 000,000,000,000,000,000,000,000
1116 DATA 000,000,000,000,000,000,000,000
1117 DATA 000,000,000,000,000,000,000,000
1118 DATA 000,000,000,000,000,000,000,000
1119 DATA 000,000,000,000,000,000,000,000
1120 DATA 000,000,000,000,000,000,000,000
1121 DATA 000,000,000,000,000,000,000,000
1122 DATA 000,000,000,000,000,000,000,000
1123 DATA 000,000,000,000,000,000,000,000
1124 DATA 000,000,000,000,000,000,000,000
1125 DATA 000,000,000,000,000,000,000,000
1126 DATA 000,000,000,000,000,000,000,000
1127 DATA 000,000,000,000,000,000,000,000
1128 DATA 000,000,000,000,000,000,000,000
1129 DATA 000,000,000,000,000,000,000,000
1130 DATA 000,000,000,000,000,000,000,000
1131 DATA 000,000,000,000,000,000,000,000
1132 DATA 000,000,000,000,000,000,000,000
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1138 DATA 000,000,000,000,000,000,000,000
1139 DATA 000,000,000,000,000,000,000,000
1140 DATA 000,000,000,000,000,000,000,000
1141 DATA 000,000,000,000,000,000,000,000
1142 DATA 000,000,000,000,000,000,000,000
1143 DATA 000,000,000,000,000,000,000,000
1144 DATA 000,000,000,000,000,000,000,000
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1146 DATA 000,000,000,000,000,000,000,000
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1148 DATA 000,000,000,000,000,000,000,000
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1154 DATA 000,000,000,000,000,000,000,000
1155 DATA 000,000,000,000,000,000,000,000
1156 DATA 000,000,000,000,000,000,000,000
1157 DATA 000,000,000,000,000,000,000,000
1158 DATA 000,000,000,000,000,000,000,000
1159 DATA 000,000,000,000,000,000,000,000
1160 DATA 000,000,000,000,000,000,000,000
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Screen shots taken from the Amiga version.



PROGRAMMING: SPECTRUM

1161 DATA 000,000,000,000,000,000,000,000	1174 DATA 000,000,000,000,000,000,000,000	1187 DATA 209,225,019,003,044,125,167,032
1162 DATA 000,000,000,000,000,000,000,000	1175 DATA 000,000,000,000,000,000,000,000	1188 DATA 216,124,254,200,032,004,038,208
1163 DATA 000,000,000,000,000,000,000,000	1176 DATA 000,000,000,000,000,000,000,000	1189 DATA 024,207,033,000,200,017,000,064
1164 DATA 000,000,000,000,000,000,000,000	1177 DATA 000,000,000,000,000,000,000,000	1190 DATA 001,000,016,237,176,033,000,216
1165 DATA 000,000,000,000,000,000,000,000	1178 DATA 000,000,000,000,000,000,000,000	1191 DATA 017,000,088,001,000,002,237,176
1166 DATA 000,000,000,000,000,000,000,000	1179 DATA 000,000,000,000,000,000,000,000	1192 DATA 201,104,038,000,041,041,041,041
1167 DATA 000,000,000,000,000,000,000,000	1180 DATA 000,000,000,000,000,000,000,000	1193 DATA 041,125,129,111,124,198,227,103
1168 DATA 000,000,000,000,000,000,000,000	1181 DATA 000,000,000,000,000,000,000,000	1194 DATA 201,167,040,010,254,001,040,008
1169 DATA 000,000,000,000,000,000,000,000	1182 DATA 033,000,200,017,000,227,001,000	1195 DATA 254,002,040,006,005,201,012,201
1170 DATA 000,000,000,000,000,000,000,000	1183 DATA 216,026,229,213,197,095,022,250	1196 DATA 004,201,013,201,126,167,192,044
1171 DATA 000,000,000,000,000,000,000,000	1184 DATA 008,026,002,008,235,111,038,000	1197 DATA 126,167,192,197,001,031,000,009
1172 DATA 000,000,000,000,000,000,000,000	1185 DATA 041,041,041,001,000,247,009,006	1198 DATA 193,126,167,192,044,126,201,197
1173 DATA 000,000,000,000,000,000,000,000	1186 DATA 008,126,018,020,035,016,250,193	1199 DATA 042,232,253,125,185,048,007,121

1 REM section 4	1038 DATA 255,000,000,000,241,241,241,241	1088 DATA 252,252,254,238,230,070,130,006
10 REM programming	1039 DATA 241,000,000,000,255,255,255,255	1089 DATA 000,000,060,031,007,003,063,095
20 RESTORE 1000: FOR c=62144 TO 62343:	1040 DATA 241,000,000,000,241,241,241,241	1090 DATA 000,000,000,000,129,227,255,255
READ a: POKE c,a: NEXT c	1041 DATA 000,255,255,146,146,146,255,000	1091 DATA 095,035,027,007,012,179,252,000
30 REM graphics	1042 DATA 000,255,255,073,073,073,255,000	1092 DATA 255,254,242,140,112,128,000,000
40 RESTORE 1025: FOR c=63232 TO 64095:	1043 DATA 126,070,070,126,070,070,126,070	1093 DATA 096,065,099,101,085,089,047,047
READ a: POKE c,a: NEXT c	1044 DATA 070,126,070,070,126,070,070,126	1094 DATA 000,128,196,204,204,220,248,248
59 REM save code	1045 DATA 024,102,129,153,255,153,129,255	1095 DATA 047,023,023,023,011,009,006,001
60 SAVE "level0-3"CODE 45056,2048: VERI	1046 DATA 014,011,009,115,228,254,254,124	1096 DATA 240,224,224,192,192,192,032,240
FY "level0-3"CODE 45056,2048	1047 DATA 003,014,060,120,060,060,112,192	1097 DATA 003,007,007,009,009,007,006,115
70 SAVE "code"CODE 59392,4704: VERIFY "	1048 DATA 007,007,253,253,231,167,160,000	1098 DATA 192,224,224,144,144,224,102,230
code"CODE 59392,4704	1049 DATA 000,000,001,003,063,061,059,059	1099 DATA 114,250,240,015,127,252,056,056
1000 DATA 149,111,014,002,024,004,145,111	1050 DATA 000,240,248,224,128,224,240,240	1100 DATA 175,175,031,240,135,063,014,014
1001 DATA 014,000,124,184,048,007,120,148	1051 DATA 027,027,029,015,031,024,000,000	1101 DATA 000,000,060,098,098,122,060,000
1002 DATA 103,006,003,024,004,144,103,006	1052 DATA 240,240,224,128,000,000,000,000	1102 DATA 000,114,074,072,096,014,013,101
1003 DATA 001,125,188,048,004,108,120,193	1053 DATA 000,000,024,031,015,029,027,027	1103 DATA 000,078,082,018,006,112,048,038
1004 DATA 201,121,193,201,197,237,075,245	1054 DATA 000,000,000,000,128,224,240,240	1104 DATA 097,000,001,099,072,074,114,000
1005 DATA 242,003,120,230,015,071,237,067	1055 DATA 059,059,061,063,003,001,000,000	1105 DATA 134,000,128,198,018,082,078,000
1006 DATA 245,242,010,193,201,221,002,229	1056 DATA 240,240,224,128,224,248,240,000	1106 DATA 255,224,238,238,238,238,238,238
1007 DATA 197,225,205,024,243,225,017,087	1057 DATA 000,000,015,015,015,012,027,063	1107 DATA 255,001,001,001,225,225,239,239
1008 DATA 243,006,004,205,092,243,201,229	1058 DATA 000,000,000,236,252,056,216,248	1108 DATA 238,238,238,238,238,238,238,238
1009 DATA 111,038,000,205,024,243,225,017	1059 DATA 127,119,119,099,032,000,000,000	1109 DATA 239,239,239,239,239,239,239,255
1010 DATA 089,243,006,002,205,092,243,201	1060 DATA 240,224,224,192,000,000,000,000	1110 DATA 000,003,029,125,127,191,191,155
1011 DATA 017,087,243,175,001,232,003,008	1061 DATA 000,000,000,055,063,028,027,031	1111 DATA 000,192,248,252,124,060,250,246
1012 DATA 205,071,243,008,198,048,018,019	1062 DATA 000,000,240,240,224,048,216,252	1112 DATA 153,079,079,065,064,039,056,000
1013 DATA 175,001,100,000,008,205,071,243	1063 DATA 015,007,007,003,000,000,000,000	1113 DATA 230,254,254,230,028,012,240,000
1014 DATA 008,198,048,018,019,175,001,010	1064 DATA 254,238,238,198,004,000,000,000	1114 DATA 255,241,241,241,255,255,255,255
1015 DATA 000,008,205,071,243,008,198,048	1065 DATA 000,015,031,007,001,007,015,015	1115 DATA 000,124,116,116,126,118,118,126
1016 DATA 018,019,125,198,048,018,201,124	1066 DATA 000,000,128,192,252,188,220,220	1116 DATA 000,110,110,110,126,014,014,014
1017 DATA 184,216,032,003,125,185,216,008	1066 DATA 015,015,007,001,000,000,000,000	1117 DATA 000,126,118,118,126,112,112,112
1018 DATA 060,008,167,237,066,024,240,048	1068 DATA 216,216,184,240,248,024,000,000	1118 DATA 000,126,118,118,126,118,118,118
1019 DATA 050,048,055,124,124,230,248,254	1069 DATA 000,000,000,000,001,007,015,015	1119 DATA 000,118,118,118,118,118,118,126
1020 DATA 088,208,254,064,216,103,026,213	1070 DATA 000,000,024,248,240,184,216,216	1120 DATA 000,112,112,112,112,112,112,126
1021 DATA 197,229,095,022,000,235,041,041	1071 DATA 015,015,007,001,007,031,015,000	1121 DATA 007,042,042,042,042,042,042,042
1022 DATA 041,237,075,054,092,009,006,008	1072 DATA 220,220,188,236,192,128,000,000	1122 DATA 042,042,042,042,042,042,042,042
1023 DATA 126,018,020,035,016,250,225,193	1073 DATA 000,000,000,032,099,119,119,127	1123 DATA 002,002,002,002,070,070,070,070
1024 DATA 209,035,019,016,215,201,000,000	1074 DATA 000,000,000,000,192,224,224,240	1124 DATA 007,007,007,007,007,007,007,007
1025 DATA 000,000,000,000,000,000,000,000	1075 DATA 063,027,012,007,015,015,000,000	1125 DATA 007,007,007,007,007,007,007,007
1026 DATA 255,000,000,000,255,255,255,255	1076 DATA 248,216,056,252,236,000,000,000	1126 DATA 007,007,007,007,007,007,007,007
1027 DATA 241,241,241,241,241,241,241,241	1077 DATA 000,000,000,000,003,007,007,015	1127 DATA 007,007,007,007,007,007,007,007
1028 DATA 255,224,224,224,255,255,255,255	1078 DATA 000,000,000,004,198,238,238,254	1128 DATA 007,007,007,007,007,007,007,007
1029 DATA 255,001,001,001,255,255,255,255	1079 DATA 031,027,028,063,055,000,000,000	1129 DATA 007,007,007,007,007,007,007,007
1030 DATA 241,241,241,241,255,255,255,255	1080 DATA 252,216,048,240,240,240,000,000	1130 DATA 023,023,023,023,002,048,048,048
1031 DATA 255,241,241,241,241,241,241,241	1081 DATA 000,000,001,015,063,127,127,255	1131 DATA 048,007,007,007,007,004,004,004
1032 DATA 241,240,240,240,255,255,255,255	1082 DATA 000,063,253,240,224,248,252,254	1132 DATA 004,007,007,007,007,007,007,007
1033 DATA 241,001,001,001,255,255,255,255	1083 DATA 199,185,198,129,000,000,000,000	1133 PRINT
1034 DATA 255,240,240,240,241,241,241,241	1084 DATA 194,252,192,032,248,060,000,000	
1035 DATA 255,001,001,001,241,241,241,241	1085 DATA 015,005,002,002,002,005,005,011	
1036 DATA 241,001,001,001,241,241,241,241	1086 DATA 128,224,240,240,248,248,248,252	
1037 DATA 241,240,240,240,241,241,241,241	1087 DATA 023,021,058,050,050,034,001,000	

Blackwolf

J Myatt

You are Blackwolf, ace fighter pilot who has been shot down over enemy territory while reconnoitering their defences. The grand attack of your forces takes place in only five hours so unless you escape from the enemy compound in time

to give them the valuable info, a fiasco is inevitable.

The game runs in Mode 5 and is similar in vein to Ravenskull. The program will be presented over three weeks, and consists of two listings.

```

10 REM *****
20 REM * MOOSEYSOFT *
30 REM * PRESENTS *
40 REM * LONEWOLF *
50 REM * BY *
60 REM * John myatt *
70 REM * Aided By *
80 REM * The Alien *
90 REM *****
100 *FX20,6
110 PAGE=PAGE+&200
120 MODE5:VDU23;B202;0;0;0;
130VDU23,128,&0C0C;&3C0C;&1F3F;&070F;
140VDU23,129,&3030;&3C30;&F8FC;&E0F0;
150VDU23,130,&E040;&E0E0;&2020;&C060;
160VDU23,131,&1800;&3C3C;&3C3C;&183C;
170VDU23,132,&3C18;&7078;&E0E0;&60E0;
180VDU23,133,&0000;&3810;&0018;&0000;
190VDU23,134,&3C18;&0E1E;&0707;&0607;
200VDU23,135,&0000;&1C08;&0018;&0000;
210VDU23,136,&0702;&0707;&0404;&0306;
220VDU23,137,&F0E0;&FCF8;&303C;&3030;
230VDU23,138,&0F07;&3F1F;&0C3C;&0C0C;
240VDU23,139,&0706;&0707;&1E0E;&183C;
250VDU23,140,&E060;&E0E0;&7870;&183C;
260VDU23,141,&0306;&0101;&0707;&0207;
270VDU23,142,&C060;&B080;&E0E0;&40E0;
280VDU23,143,&0000;&0000;&3830;&0010;
290VDU23,144,&0000;&0000;&1C0C;&0008;
300VDU23,145,&E0E0;&FEE0;&70FE;&0030;
310VDU23,146,&3000;&FE70;&E0FE;&E0E0;
320VDU23,147,&1C00;&3E3E;&3E3E;&001C;
330VDU23,148,&CFBE;&007E;&0000;&0000;
340VDU23,149,&F800;&1EFC;&070F;&0000;
350VDU23,150,&0000;&0000;&3800;&1038;
360VDU23,151,&0000;&0000;&7E00;&8ECF;
370VDU23,152,&0000;&0F07;&FC1E;&F0FB;
380VDU23,153,&0000;&0000;&1000;&3838;
390VDU23,154,&0707;&7F07;&0E7F;&000C;
400VDU23,155,&0C00;&7F0E;&077F;&0707;
410VDU23,156,&F371;&007E;&0000;&0000;
420VDU23,157,&1F00;&7B3F;&E0F0;&0000;
430VDU23,158,&0000;&F0E0;&3F78;&0F1F;
440VDU23,159,&0000;&0000;&7E00;&71F3;
450VDU23,160,&D57F;&F5EA;&FDFA;&FFFFE;
460VDU23,161,&57FE;&59AD;&6181;&81C1;
470VDU23,162,&FFFF;&FFFF;&FFFF;&FFFF;
480VDU23,163,&3111;&3131;&3131;&1131;
490VDU23,164,&FEFF;&FAFD;&EAF5;&7FDB;
500VDU23,165,&C181;&8161;&AD59;&FE57;
510VDU23,166,&0000;&1E00;&001E;&0000;
520VDU23,167,&FFFF;&AF57;&BF5F;&FFFF;
530VDU23,168,&BFFF;&AF5F;&AB57;&FFFF;
540VDU23,169,&8783;&9ABD;&EAB5;&FFFF;
550VDU23,170,&FFFF;&9AB5;&868D;&8183;
560VDU23,171,&8181;&8181;&8181;&8181;
570VDU23,172,&FFFF;&AA55;&AA55;&FFFF;
580VDU23,173,&1B2C;&1B36;&0B0C;&0305;
590VDU23,174,&68D4;&64D8;&E08B;&C050;
600VDU23,175,&0B01;&1D14;&173A;&162D;
610VDU23,176,&70C0;&6890;&68D0;&68D4;
620VDU23,177,&FFFF;&95AA;&858A;&8182;
630VDU23,178,&FFFF;&55AA;&55AA;&55AA;
640VDU23,179,&FEFE;&5EAE;&7EBE;&FEFE;
650VDU23,180,&8080;&8080;&8080;&8080;
660VDU23,181,&57AB;&1F2F;&2F1F;&AB57;
670VDU23,182,&FEFE;&FEFE;&FEFE;&FEFE;
680VDU23,183,&8281;&8AB5;&AA95;&FFFF;
690VDU23,184,&AA55;&AA55;&AA55;&FFFF;
700VDU23,185,&FEFE;&8BE7;&AE5E;&FEFE;
710VDU23,186,&7F7F;&7D7F;&0239;&F804;
720VDU23,187,&04F8;&3902;&7F7D;&7F7F;
730VDU23,188,&4320;&8884;&FC98;&F8FC;
740VDU23,189,&FCF8;&98FC;&8488;&2043;
750VDU23,190,&7F7F;&7D7F;&0239;&003C;
760VDU23,191,&3C00;&3902;&7F7D;&7F7F;
770VDU23,192,&663C;&4242;&4242;&3C66;
780VDU23,193,&1800;&3C3C;&3C3C;&0018;
790VDU23,194,&4380;&4824;&FC98;&F8FC;
800VDU23,195,&FCF8;&98FC;&2448;&8043;
810VDU23,196,&0000;&7E7E;&7E7E;&007E;
820VDU23,197,&7E00;&7E7E;&7E7E;&0000;
830VDU23,198,&3000;&4848;&4848;&0300;
840VDU23,199,&562C;&56BD;&0008;&0000;
850VDU23,200,&0A01;&5705;&2D1A;&5708;
860VDU23,201,&AA40;&8B50;&D450;&D0A0;
870VDU23,202,&0F37;&0C53;&141B;&030A;
880VDU23,203,&F0E4;&6498;&D890;&40A0;
890VDU23,204,&2004;&4802;&1000;&0042;
900VDU23,205,&0C04;&0C0C;&0C0C;&040C;
910VDU23,206,&0828;&1852;&08B2;&5024;
920VDU23,207,&FFFF;&9180;&9191;&9F91;
930VDU23,208,&FFFF;&3101;&4949;&4949;
940VDU23,209,&919F;&9191;&8080;&FFFF;
950VDU23,210,&4949;&3959;&010D;&FFFF;
960VDU23,211,&FFFF;&9981;&8199;&FFFF;
970VDU23,212,&0600;&F9F9;&A0A6;&0000;
980VDU23,213,&0000;&7EFE;&1F16;&0303;
990VDU23,214,&99CC;&6633;&99CC;&6633;
1000VDU23,215,&81FF;&8181;&8181;&FF81;
1010VDU23,216,&FE54;&54FE;&1010;&1010;
1020VDU23,217,&FFFF;&BE80;&88BE;&8888;
1030VDU23,224,&1008;&3810;&7C7C;&387C;
1040VDU23,218,&FFFF;&4501;&6565;&5555;
1050VDU23,223,&5410;&FE38;&38FE;&1054;
1060VDU23,219,&8888;&BE88;&80BE;&FFFF;
1070VDU23,221,&7C7C;&1010;&0808;&0404;
1080 FOR=0T04:VDU19,T,0,0,0,0:NEXTT
1090 GCOLOR,7:MOVE0,1030:DRAW0,0:PLOT85,
1280,1030:PLOT85,1280,0
1100 GCOLOR,0:MOVE60,995:DRAW60,190:PLOT
85,1219,995:PLOT85,1219,190:MOVE60,160:D
RAW60,20:PLOT85,1219,160:PLOT85,1219,20
1110VDU23,220,&5555;&4D4D;&0145;&FFFF;
1120 GCOLOR,1:MOVE60,995:DRAW60,190:DRAW
1219,190:DRAW1219,995:DRAW60,995
1130 MOVE60,160:DRAW1219,160:DRAW1219,2
0:DRAW60,20:DRAW60,160:VDU5:MOVE395,140:
PRINT"BLACKWOLF":MOVES95,100:PRINT"By":M
OVE350,60:PRINT"John Myatt":GCOLOR,3:MOVE
410,140:PRINT"BLACKWOLF":MOVE610,100:PRI
NT"By":MOVE360,60:PRINT"John Myatt"
1140 VDU28,1,30,18,1:COLLOUR0:COLOUR128
1150 CHAIN"MODE5"
>L.
20VDU26:VDU24,65;195;1214;990;
30WZ=0:FOZ=0:F1Z=0:SZ=0:WHz=0:UPZ=0:D
OZ=0:RGZ=0:LFZ=0:MUZ=0:BAZ=0:GZ=0:DEZ=1:
FRZ=0:BKZ=0:HJZ=0:WIZ=0:BEZ=0:STZ=0:HIZ=
0:GUZ=0:XZ=3:YZ=29:XZ=9:YZ=14:PROCFRONT1
40K1Z=0:D1Z=0:K2Z=0:D2Z=0:K3Z=0:D3Z=0
50K4Z=0:D4Z=0:AXEZ=0:D5Z=0:K5Z=0:AXED
Z=0:K6Z=0:D6Z=0:K7Z=0:D7Z=0:K8Z=0:D8Z=0:
D9Z=0:K9Z=0:K10Z=0:D10Z=0:SZ=0
60P=1:Q=2:PROCR1:FORQ=3 TO 6:PROCR2:
NEXTQ:PROCR3
70JZ=10
80Q=11:PROCWAL2:Q=18:PROCWAL1:Q=25:PR
OCWAL2
90P=14:Q=4:PROCH2:P=16:PROCT:P=14:Q=2
:PROCT
100P=15:Q=8:PROCT
110COLOUR128:PROCCE
120PROCCH
130IFYZ>24:YZ=3:PROCC:PROCBACK1:GOTO17
40
140PROCBAR
150IFXZ>7:IFYZ=50RYZ=6:DZ=420:PZ=848:P
ROCL
160IFXZ<2XZ=16:PROCC:PROCLEFT1:GOTO200
170IFXZ>16XZ=3:PROCC:PROCRIGHT1:GOTO11
20
180IFYZ<3YZ=24:PROCC:PROCFRONT1:GOTO31
0
190DEZ=0:GOTO120
200Q=11:PROCWAL2:Q=18:PROCWAL1:Q=25:PR
OCWAL1
210SKZ=6:P=13:Q=5:PROCH2:P=16:PROCT:P=
3:Q=2:PROCH2:P=15:Q=8:PROCT
220P=4:Q=8:PROCT:P=2:Q=7:PROCT:P=13:Q=
2:PROCT
230PROCCE
240PROCCH
250IFXZ<11:IFYZ=30RYZ=4:DZ=320:PZ=910:
PROCL
260IFXZ>16XZ=2:PROCC:PROCRIGHT1:GOTO60
270IFYZ<3PROCC:YZ=24:PROCFRONT1:GOTO44

```


PROGRAMMING: BBC

0	2801FX%>16X%>2:PROCC:PROCRLEFT1:60T0730	420IFX%>16X%>2:PROCC:PROCRIGHT1:60T012	0
	290PROCSDH	20	570PROCSDH
	300DE%>0:60T0240	43060T0360	580DE%>0:60T0500
	310P=14:Q=22:PROCH:Q=12:PROCH:N=900:FO	440Q=10:PROCWAL1:P=13:Q=14:PROCH2:Q=4:	590M=380:FORN=1150 TO 340STEP=40:PROC
RM=350 TO 550STEP32:PROCRIV1:NEXTM:P=17	PROCWAL2:SK%>15:M=380:FORN=60 TO 1150ST	PROCRIV1:NEXTN	RIV1:NEXTN
:Q=21:PROCL:Q=14:PROCL	450P=16:Q=16:PROCT:P=5:Q=18:PROCT:P=12		600N=345:FORM=412 TO 682STEP32:PROCR
320Q=10:PROCWAL1:P=1:Q=12:PROCR1:FQRQ=	:Q=12:PROCT		V1:NEXTM:P=1:Q=21:PROCT:P=2:Q=13:PROCT
13 TO 15:PROCR2:NEXTQ:PROCR3:Q=20:PROCR	460P=3:Q=12:PROCH:P=15:Q=21:PROCH2		610Q=10:PROCWAL2:P=17:Q=24:PROCT:P=13:
1:FQRQ=21 TO 23:PROCR2:NEXTQ:PROCR3	470P=2:Q=23:PROCH:P=13:Q=25:PROCT		Q=23:PROCH
330IFGU%>0:COLOUR1:COLOUR128:VDU31,16,	480IFD7%>0:COLOUR129:Q=3:PROCDH		620P=4:Q=23:PROCH2:P=2:Q=25:PROCT:P=16
19:VDU213	490PROCRC		:Q=12:PROCH2:P=13:Q=12:PROCT:P=8:Q=16:PR
340P=3:Q=21:PROCH2:Q=4:PROCWAL2	500PROCRC		OCH:P=7:Q=8:PROCT
350PROCRC	510IFX%>5:IFY%>22ORY%>23:O%>500:P%>303		630IFD1%>0:Q=9:COLOUR129:PROCDH
360PROCRC	:PROCL		640Q=4:PROCWAL1:P=3:Q=20:PROCT:P=PROCR
370IFX%>12:IFY%>22ORY%>23:O%>320:P%>30	520IFX%>16X%>2:PROCC:PROCRIGHT1:60T031		650PROCRC
3:PROCL	0		660IFX%>11:IFY%>24:O%>370:P%>240:PROCL
380IFGU%>0:IFX%>16:IFY%>19:PROCTING:6U	530IFK7%>1:IFD7%>0:IFY%>5:PROCTING:Q=3		670IFX%>7:IFY%>13ORY%>14:O%>550:P%>588
%>1	:PROCDHVC:D7%>1		:PROCL
390IFY%>3Y%>24:PROCC:PROCFRONT1:60T016	540IFY%>24PROCC:Y%>3:PROCBACK1:60T0200		680IFD1%>0:IFK1%>1:IFY%>11:Q=9:PROCDHVC
00	550IFX%>2PROCC:Y%>16:PROCLLEFT1:60T0590		C:PROCTING:D1%>1
400IFY%>24PROCC:Y%>3:PROCBACK1:60T060	560IFY%>3PROCC:Y%>24:PROCLLEFT1:60T0208		690IFX%>16X%>2:PROCC:PROCRIGHT1:60T044
410IFX%>2PROCC:Y%>16:PROCLLEFT1:60T0440			0

Odyssey 15+

Richard Thomas

Let's face it, the 1541 disc drive is appallingly slow. You've seen fast loaders for the thing before, but this is one of the very quickest. File operations are enhanced to the tune of fifteen times faster.

To activate the system type in and run the program. The title should now appear in

the top left of the screen indicating that disc operations are ready to commence. There is only one point to note, that is that if a program resides at \$C800 then it will crash.

For a copy of the program plus other utilities send £2.50 to 67 Fountain Street, Godley, Hyde, Cheshire SK14 2PS.

```

0 REM ---
1 REM --- 15* FASTER DISC LOADING
2 REM --- BY ODYSSEY COMMUNICATIONS
3 REM ---
4 POKE53281,12:POKE53280,11
5 PRINT"ODYSSEY"TAB(8)"PROGRAMMING ODYSSEY 15+"
6 PRINTTAB(14)"PLEASE WAIT .."
7 PRINT"  1-1  L"TAB(33)"|  1-1  | "CHR$(13)TAB(33)"211070"
8 FORQ=0TO1909:READA
9 B=B+A:POKE51200+Q,A
10 PRINT"XXXXXXXXXX"B
11 NEXT
12 IF B<>211070 THEN PRINT "  X  *ORRY, BUT YOU'VE AN ERROR !":END
13 PRINT"  X  ODYSSEY 15+ INSTALLED TYPE SYS 51200"
14 PRINT"  X  ..BUT JUST WAIT A NO.."
15 SA=51200:EA=53095
16 OPEN1,8,1,"ODYSSEY 15+"
17 HB=INT(SA/256):LB=SA-HB*256
18 PRINT#1,CHR$(LB);CHR$(HB);
19 FORI=SATOEA
20 PRINT#1,CHR$(PEEK(I));
21 NEXT
22 CLOSE1
23 DATA 76,193,200,169,3,141,0,221,160,63,238,32,208,44,0,221,80
24 DATA 251,44,0,221,80,3,36,147,234,44,0,221,112,2,36,147,112
25 DATA 0,162,4,202,208,253,174,0,221,189,2,196,174,0,221,29,3
26 DATA 196,174,0,221,29,0,196,174,0,221,29,1,196,153,0,197,174
27 DATA 0,221,189,2,196,174,0,221,29,3,196,174,0,221,29,0,196
28 DATA 174,0,221,29,1,196,153,64,197,174,0,221,189,2,196,174,0
29 DATA 221,29,3,196,174,0,221,29,0,196,174,0,221,29,1,196,153
30 DATA 128,197,174,0,221,189,2,196,174,0,221,29,3,196,174,0,221

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31 DATA 29,0,196,174,0,221,29,1,196,153,192,197,174,0,221,189,2
32 DATA 196,174,0,221,29,3,196,174,0,221,29,0,196,174,0,221,29
33 DATA 1,196,234,44,0,221,80,0,153,0,198,136,48,3,76,40,200
34 DATA 169,35,141,0,221,96,169,215,141,48,3,169,200,141,49,3,162
35 DATA 0,189,218,203,232,32,210,255,208,247,96,201,0,133,147,208,18
36 DATA 160,0,177,187,201,36,240,10,169,242,141,40,3,169,200,141,41
37 DATA 3,76,167,244,169,237,141,40,3,169,246,141,41,3,104,133,2
38 DATA 201,251,208,6,104,201,244,240,7,72,165,2,72,76,237,246,32
39 DATA 32,202,120,173,0,221,141,0,196,173,32,208,141,1,196,169,3
40 DATA 141,0,221,32,149,202,160,3,169,11,141,17,208,204,18,208,208
41 DATA 251,136,208,248,169,255,133,251,133,147,32,110,204,165,174,56,233
42 DATA 2,133,174,165,175,233,0,133,175,160,0,177,174,72,200,177,174
43 DATA 72,165,174,133,252,165,175,133,253,32,3,200,173,55,197,133,7
44 DATA 16,18,166,251,232,32,10,202,165,254,133,174,165,255,133,175,169
45 DATA 0,133,251,165,7,41,32,240,8,134,63,232,134,64,76,192,201
46 DATA 165,7,41,63,197,251,144,2,133,251,170,32,10,202,173,0,197
47 DATA 208,15,169,2,133,254,169,199,133,255,172,1,197,136,140,0,199
48 DATA 160,49,185,2,197,145,254,136,16,248,32,208,202,165,63,197,66
49 DATA 208,4,36,7,80,157,173,0,196,141,0,221,169,27,141,17,208
50 DATA 173,1,196,141,32,208,160,1,104,145,252,136,104,145,252,166,251
51 DATA 32,10,202,88,165,63,197,66,208,31,172,0,199,136,165,2,199
52 DATA 145,254,136,192,255,208,246,165,254,24,109,0,199,133,174,165,255
53 DATA 105,0,133,175,76,40,245,169,29,76,21,247,136,24,101,175,133
54 DATA 255,138,10,133,2,165,174,56,229,2,133,254,176,2,198,255,96
55 DATA 169,240,133,98,169,203,133,99,169,3,141,129,202,169,0,141,130
56 DATA 202,162,4,32,139,202,160,5,185,128,202,32,168,255,136,16,247
57 DATA 160,0,177,98,32,168,255,200,192,35,208,246,32,174,255,202,240
58 DATA 27,173,130,202,24,105,35,141,130,202,144,3,238,129,202,165,98
59 DATA 24,105,35,133,98,144,201,230,99,208,197,32,139,202,160,4,185
60 DATA 134,202,32,168,255,136,16,247,76,174,255,35,3,105,87,45,77
61 DATA 3,0,69,45,77,169,8,32,177,255,169,111,76,147,255,162,3
62 DATA 160,0,169,4,133,2,185,177,202,157,0,196,232,200,198,2,208
63 DATA 244,138,24,105,60,170,144,233,96,10,5,160,80,2,1,32,16
64 DATA 8,4,128,64,0,0,0,0,162,5,189,61,198,157,61,197,202
65 DATA 16,247,165,65,208,72,169,254,133,97,162,2,189,52,197,157,64
66 DATA 198,202,16,247,162,0,134,65,134,66,160,48,189,65,197,74,74
67 DATA 74,133,2,189,65,197,41,7,74,93,66,197,41,63,93,66,197
68 DATA 42,42,42,170,189,187,203,166,2,29,165,203,200,145,254,69,66
69 DATA 133,66,165,65,105,5,133,65,176,169,170,189,61,197,74,41,31
70 DATA 133,2,189,62,197,106,74,74,74,170,189,187,203,166,2,29,165
71 DATA 203,200,196,97,240,90,145,254,69,66,133,66,166,65,189,63,197
72 DATA 10,189,62,197,42,41,31,133,2,189,63,197,74,74,41,31,170
73 DATA 189,187,203,166,2,29,165,203,200,145,254,69,66,133,66,166,65
74 DATA 189,64,197,41,224,10,93,63,197,41,252,93,63,197,42,42,42
75 DATA 133,2,189,64,197,41,31,170,189,187,203,166,2,29,165,203,200
76 DATA 145,254,69,66,133,66,166,65,76,231,202,133,63,162,9,165,66
    
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PROGRAMMING: C64

```
77 DATA 93,0,197,93,10,197,93,20,197,93,30,197,93,40,197,202,16
78 DATA 238,77,50,197,133,66,96,128,0,16,255,192,64,80,255,255,32
79 DATA 48,255,240,96,112,255,144,160,176,255,208,224,8,0,1,255,12
80 DATA 4,5,255,255,2,3,255,15,6,7,255,9,10,11,255,13,14
81 DATA 18,147,13,5,32,79,68,89,83,83,69,89,32,49,53,43,13
82 DATA 32,32,32,32,0,120,160,0,240,16,0,32,0,128,16,48,64
83 DATA 192,0,2,0,8,1,3,4,12,169,255,133,194,169,0,141,0
84 DATA 24,169,3,133,10,169,1,44,0,24,240,251,44,0,24,240,3
85 DATA 36,128,234,44,0,24,208,2,36,194,44,0,24,208,0,234,234
86 DATA 234,234,36,128,174,0,24,189,5,3,174,0,24,29,7,3,234
87 DATA 174,0,24,29,13,3,174,0,24,29,15,3,162,2,142,0,24
88 DATA 162,0,142,0,24,153,0,4,234,234,234,200,208,212,238,104,3
89 DATA 198,10,208,172,169,8,141,0,24,76,25,6,162,240,169,205,141
90 DATA 152,204,169,3,133,2,160,0,234,234,169,35,141,0,221,234,234
91 DATA 169,3,141,0,221,36,147,169,35,141,0,221,234,169,3,141,0
92 DATA 221,185,0,208,133,64,143,0,221,74,74,143,0,221,165,64,10
93 DATA 10,10,10,141,0,221,74,74,143,0,221,169,0,141,0,221,234
94 DATA 44,0,221,48,0,200,208,215,238,152,204,198,2,208,179,169,35
95 DATA 141,0,221,96,134,134,134,134,76,187,4,162,15,173,0,24,41
96 DATA 1,208,249,160,63,169,0,141,0,24,234,234,169,8,141,0,24
97 DATA 36,128,169,0,141,0,24,234,169,8,141,0,24,169,0,141,0
98 DATA 24,185,0,3,74,76,187,4,162,15,173,0,24,41,1,208,249
99 DATA 160,63,169,0,141,0,24,234,234,169,8,141,0,24,36,128,169
100 DATA 0,141,0,24,234,169,8,141,0,24,169,0,141,0,24,185,0
101 DATA 3,74,74,74,74,141,0,24,10,143,0,24,185,0,3,143,0
102 DATA 24,10,143,0,24,185,64,3,74,74,74,74,141,0,24,10,41
103 DATA 15,141,0,24,185,64,3,143,0,24,10,41,15,141,0,24,185
104 DATA 128,3,74,74,74,74,141,0,24,10,143,0,24,185,128,3,143
105 DATA 0,24,10,143,0,24,185,192,3,74,74,74,74,141,0,24,10
106 DATA 143,0,24,185,192,3,143,0,24,10,36,128,143,0,24,185,186
107 DATA 1,74,74,74,74,141,0,24,10,143,0,24,185,186,1,143,0
108 DATA 24,10,136,143,0,24,48,8,169,0,142,0,24,76,41,4,169
109 DATA 8,141,0,24,96,169,238,141,12,28,32,0,254,169,0,133,9
110 DATA 165,8,32,75,242,133,194,32,86,245,80,254,184,173,1,28,201
111 DATA 82,208,243,162,0,80,254,184,173,1,28,157,1,3,232,224,5
112 DATA 208,242,32,86,245,80,254,184,173,1,28,157,0,3,232,224,10
113 DATA 208,242,169,0,133,52,133,48,169,3,133,49,32,230,247,166,9
114 DATA 165,84,157,96,7,32,230,247,166,9,165,83,157,0,7,165,84
115 DATA 157,32,7,230,9,165,194,197,9,240,3,76,206,4,160,0,162
116 DATA 255,152,232,221,96,7,208,250,138,153,128,7,200,196,194,144,238
117 DATA 166,15,169,128,133,195,160,0,132,9,132,196,200,189,128,7,170
118 DATA 152,157,64,7,189,0,7,197,8,208,7,189,32,7,170,76,74
119 DATA 5,134,15,201,0,208,4,169,64,133,196,132,14,169,0,170,189
120 DATA 64,7,208,9,232,228,194,144,246,162,0,240,242,134,10,189,96
121 DATA 7,133,9,169,3,133,49,32,10,245,80,254,184,173,1,28,145
122 DATA 48,200,208,245,160,186,80,254,184,173,1,28,153,0,1,200,208
123 DATA 244,169,0,133,54,169,0,133,52,169,13,133,12,32,230,247,166
124 DATA 54,165,82,157,255,2,165,83,157,0,3,165,84,157,1,3,165
125 DATA 85,157,2,3,138,24,105,4,133,54,198,12,208,221,162,2,189
126 DATA 250,1,157,52,3,202,16,247,166,10,189,64,7,198,14,208,2
127 DATA 5,196,5,195,170,202,142,55,3,169,0,166,10,157,64,7,133
128 DATA 195,32,3,4,165,14,240,14,165,10,24,105,3,197,194,144,2
129 DATA 229,194,76,111,5,169,1,76,105,249,169,6,76,105,249,88,169
130 DATA 18,141,7,28,169,8,141,0,24,162,0,138,133,196,157,0,7
131 DATA 232,208,250,165,24,166,25,133,8,134,15,169,224,133,1,165,1
132 DATA 48,252,201,1,208,16,166,15,189,32,7,133,15,189,0,7,133
133 DATA 8,208,230,240,15,120,169,32,141,55,3,32,3,4,32,98,6
134 DATA 76,69,230,169,1,133,28,96,134,0,213,0,255,0,255,0,32
135 DATA 129,255,32,0,200,96
```

READY.

PList

Graham Russell

This QL procedure will list all *SuperBasic* functions and procedures, and their corresponding line numbers. To run the program enter a=RESPR(3000) and run it. If it is error free a file will be saved to microdrive which can be reloaded using a=RESPR(500), LBYTES mdv1_PLIST,a and CALL a.

```

10  RESTORE 90
20  tot=0
30  FOR n=260000 TO 260248 STEP 2
40  READ a:IF a<28600:tot=tot+a:ELSE tot=tot-a
50  POKE_W n,a
60  NEXT n
70  IF tot<>912395:PRINT "Error":STOP
80  SBYTES mdv1_PLIST,260000,248
90  DATA 12408,272,17402,4,20176,1,14,1360
100 DATA 19529,21332,0,0,0,10862,24,-9266
110 DATA 10350,28,-9778,9838,32,-10290,-9476,912
120 DATA 17914,188,9404,8224,8224,9554,4,12821
130 DATA 3137,1026,26390,3137,1281,27398,3137,1284
140 DATA 27412,20557,-17971,26328,28672,20085,17402,102
150 DATA 24914,24844,24812,17402,104,24904,24834,24802
160 DATA 8779,-11539,2,29696,5145,28679,20035,17402
170 DATA 92,24880,12845,4,17402,108,12929,-27698
180 DATA 16890,92,-28210,11784,13432,242,20114,-24952

```

RWipe

Barry Dorrans

This program for the BBC will clear a specified RAM bank. The syntax is simply *RWIPE x where x is the bank number in hex.

```

00SARBS=&FFDA
100mem=&70
200FOR pass=0 TO 3 STEP 3
300PZ=&900
400IDPT pass
500LDA #1:LDX #mem:LDY #0
600JSR OSARBS
700LDY #0
800LDA (mem),Y
900STA param
1000CMP #48:BCC error
1100JSR hex
1200SEC
1300SBC #48
1400CLC
1500CMP #16
1600BCS error
1700STA param
1710TAY
1720LDA #0
1730STA &FF30,Y
1930LDA #0:STA &70:LDA #&80:STA &71
1940LDY#0:TYA
1950.wloop:LDA #0
1960STA (&70),Y:INY:CPY #0:BNE wloop
1970INC &80:LDA &80:CMP #&C0:BNE wloop
2000RTS
2100.error:BRK:EQUB(214):EQUB "Syntax :
RWIPE (<0-F>):BRK
2200.hex
2300CMP #58:BCC ret
2400CMP #65:BCC error
2500SEC:SBC #7:RTS
2600.ret:RTS
2800.param:BRK
2900JNEXT

```

CPrint

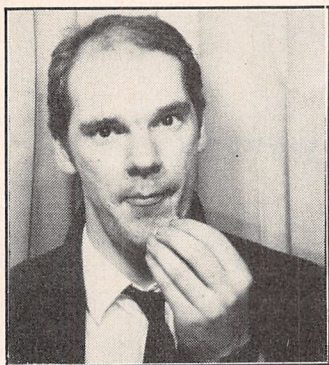
Graham Russell

Print text in a circle with this QL utility. The syntax for the procedure is CPRINT Y, X, RADIUS, ZZ, STRING where ZZ is the amount to multiply height by to get an ellipse. For example 0.3 would give a squashed circle.

```

100 DEFine PROCedure cprint (pd,pa,r,e,a$)
110 LOCAL h,n
120 h=1
130 FOR n=1 TO 360 STEP 360/LEN(a$)
140 CURSOR pa+r*COS(RAD(n)), pd+r*e*SIN(RAD(n))
150 PRINT a$(h) :h=h+1
160 NEXT n
170 END DEFine

```

with Kenn Garroch

Old Vic beats the burglars

T Dee, of Kingston, Surrey, writes:

Q To protect my father's unit from burglars, I bought an old Vic-20 and hooked it up to micro-switches, pressure pads, and infra-red motion detectors etc. Should the unit be broken into, sirens sound, lights flash, and computer will phone for help. The problem arises that all the burglar has to do is turn off the computer's power supply.

Obviously this is a big drawback. Would a CMOS battery backup capacitor solve the problem, bearing in mind that it has to work 3 DIL relays? If so, where do I connect it?

Also, during tests, the computer got rather hot. Is it safe to leave it on 24 hours a day 365 days a year?

And last but definitely not least, one night during a thunder storm, the alarm went off for no physical reason (the first false alarm since testing began) phoning and waking everybody up at 5.30 am. I put it down to the storm and connected the shield from the power supply to a metal box that encloses the VIC. Will this help any?

A I'm not too sure what you mean by a CMOS battery back up capacitor, however you are right to say that you need some kind of backup power supply. Normally, the VIC runs on 9V or from its separate power supply and this would be difficult to supply without a generator. Internally however, all of the chips run on 5V so it ought to be possible to provide a

power supply from a battery system that is continuously on trickle charge from the mains supply.

When the main power goes off, the battery can be used to support the VIC and its peripherals. A 12V car battery should do the job, all you have to do is cut down the voltage a little with a potential divider - remembering to use high power resistors.

If the VIC will work on a single 5V supply then one battery ought to last about 10 hours. You will need to look around inside the VIC to find out where the main supply comes from, disconnect it, and connect the battery instead.

An alternative solution is to set the alarms off when the power goes off, again using a battery powered emergency system. This does lack a little finesse, and it would be better to have the computer in the loop all the time.

Pretty well all computers get hot when left running for a while, the problem is that most home computers are not guaranteed (or expected) to work non-stop for a year. The best thing to do would be to re-case the VIC in something that provides a lot more ventilation. In addition, it may be an idea to increase the size of any internal heatsinks. You might like to install a temperature sensor in the case that connects, via the VIC to a fan which can be switched on in times of crisis.

The great Space chase

Mark Hula, of Fishponds, Bristol, writes:

Q I'm trying to write an 'Alien Intelligence' routine in Basic on my Amiga and, once perfected, convert it to C.Sy alien intelligence. I mean how some space invaders, or whatever, locates you without being too intelligent or too random.

My problem is this: I've written a routine for an alien to locate you but it suffers from the *Gauntlet syndrome*, ie if there is an obstacle in the way and you are on the other side then it just sits and waits.

I tried to make my routine only change direction when the alien came to a junction. This is fine, the alien

Follow that Alien

```
DIM obst(100,1),aps(1),yps(1)
RANDOMIZE TIMER
FOR t=0 TO 100
  ob=INT(RND(9)*100)
  obst(ob,0)=INT(RND(9)*30)
  obst(ob,1)=INT(RND(9)*10)
NEXT
GOSUB putobs
GOSUB puty
GOSUB puta
GOSUB plocs
main:
GOSUB find
a$=INPUT$(1)
END
```

```
find:
df=0
IF RND(9)>.5 THEN GOSUB mvx ELSE GOSUB mvxy:df=1
IF df=1 THEN GOSUB mvxy ELSE GOSUB mvx
IF aps(0)=yps(0) AND aps(1)=yps(1) THEN RETURN
GOTO find
```

```
mvx:
IF RND(9)>.5 THEN dir=1 ELSE dir=-1
mvxa:
x=aps(0):y=aps(1)+dir:GOSUB checkob
IF ptrue=1 THEN RETURN
aps(1)=aps(1)+dir
GOSUB putat
GOSUB plocs
x=aps(0)+dir:y=aps(1):GOSUB checkob
IF ptrue=1 THEN mvxa
x=aps(0)-dir:y=aps(1):GOSUB checkob
IF ptrue=1 THEN mvxa
RETURN
```

```
mvxy:
IF RND(9)>.5 THEN dir=1 ELSE dir=-1
mvxya:
x=aps(0)+dir:y=aps(1):GOSUB checkob
IF ptrue=1 THEN RETURN
aps(0)=aps(0)+dir
GOSUB putat
GOSUB plocs
x=aps(0):y=aps(1)+dir:GOSUB checkob
IF ptrue=1 THEN mvxya
x=aps(0):y=aps(1)-dir:GOSUB checkob
IF ptrue=1 THEN mvxya
RETURN
```

```
mvx:
IF aps(0)>yps(0) THEN dir=-1 ELSE dir=1
x=aps(0)+dir:y=aps(1):GOSUB checkob
IF ptrue=1 THEN RETURN
aps(0)=aps(0)+dir
GOSUB putat
```


Follow that Alien

```
GOSUB plocs
GOTO mvx

mvx:
IF aps(1)=yps(1) THEN RETURN
IF aps(1)>yps(1) THEN dir=-1 ELSE dir=1
x=aps(0):y=aps(1)+dir:GOSUB checkob
IF ptrue=1 THEN RETURN
aps(1)=aps(1)+dir
GOSUB putat
GOSUB plocs
GOTO mvx

checkob:
IF aps(0)=yps(0) AND aps(1)=yps(1) THEN ptrue=1:RETURN
ptrue=0
FOR t%=0 TO 100
IF x=obst(t%,0) AND y=obst(t%,1) THEN ptrue=1:t%=101
NEXT
RETURN

puty:
GOSUB nypos
x=yps(0):y=yps(1):GOSUB checkob
IF ptrue=1 THEN GOTO puty
LOCATE yps(1)+2,yps(0)+1:PRINT"Y"
RETURN

nypos:
yps(0)=INT(RND(9)*30)
yps(1)=INT(RND(9)*10)
RETURN

puta:
GOSUB napos
IF aps(0)=yps(0) AND aps(1)=yps(1) THEN puta
x=aps(0):y=aps(1):GOSUB checkob
IF ptrue=1 THEN GOTO puta
putat:
LOCATE aps(1)+2,aps(0)+1:PRINT"A"
RETURN

napos:
aps(0)=INT(RND(9)*30)
aps(1)=INT(RND(9)*10)
RETURN

plocs:
LOCATE 1,1
PRINT yps(0),yps(1),aps(0),aps(1)
RETURN

putobs:
FOR t=0 TO 50
LOCATE obst(t,1)+2,obst(t,0)+1
PRINT"O"
NEXT
RETURN
```

changes direction but then sees its x position is less than yours and naturally moves right again, the overall affect being that the alien moves left then right again straight away. I'm using your x,y position to compare with the alien's x,y position).

A I think that a better way of looking at the idea is to consider it as two searches, one in the x direction, and one in the y. Considering the program shown below, those are *Mvx* and *mvx*. I presume that these do exactly the same as yours at the moment since they have the same drawback when used on their own. They will try and move to the exact position of ? and get into trouble when they come across an obstacle standing in the way.

To get around this, I have added two other routines *mvxy* and *mvyx* that move in one direction while checking the other. In practice they are horizontal and vertical and choose which direction to go, in these dimensions, at random. This is not a complete solution since it does not always work, and there are problems at the edges of the board. However, the program should give you some idea of how to get started, and an idea of how to continue.

The program was written in Microsoft Basic on the Macintosh and uses labels instead of line numbers. There are also a few commands which may be different on your machine. The following list defines the various commands that I think are peculiar to the Xxx.

RANDOMISE TIMER sets the card number seed to be very random ie it sets it to the timer.
RND(9) produces values between 0 and 1.

LOCATE moves the text cursor to the x,y position on the screen, with 1,1 being top left.

INPUT\$(1) It reads one char from the keyboard and waits for it to appear.

The rest is pretty standard Basic.

Checkob is a routine to find if there is an object at position X,Y; *plocs* prints the current locations on the screen. The program sets up a random pattern of objects 'O' and places 'You and Alien on the screen with *puty* and *putx* at random valid locations.

Find does the finding, the rest of the program should be pretty obvious.

**Xxxxxx xxxx
xxxxxxx**

Paul Ellis, of Broadstairs, writes:

Q I am writing to you about a problem I am having with my Prism modem and my Atari ST computer. The problem is one of connecting them together. I am not sure of the correct connections. I have looked in the modem manual and the pin wiring is for the DIN interface connector. This is as follows:

Pin Connection

- 1 Receive data RXD
- 2 Transmit data TXD
- 3 Carrier detect CD
- 4 Signal ground
- 5 Request to send RTS

I have a 25-way D-type connector and have made the following connections.

- 1 to pin 3 on the Prism D
- 2 pin 2
- 3 pin 8
- 4 pin 7
- 5 pin 4

The modem used to be connected to a BBC micro... maybe it is not suitable for use with the Atari?

A Looking at this from the BBC point of view to start with, there are five lines to be connected: TXD, RXD, RIS, CTS and ground. These connect to the equivalent pins on the modem with the exception that the CTS of the BBC is connected to CD of the modem. This provides the clues for attaching it to the ST since all of the lines on the BBC are available on the ST's 25-way connector and, as far as I know, a standard RS423/232 driving system is used as software.

Try the modem connected as follows:

Prism	
25-way D	DIN
2	2 TX to TX
3	1 RX to RX
4	5 RTS to RTS
5	3 CTS to CD
4	7 Gnd to Gnd

Basically the same as your set-up but using CTS instead. Use the emulator desk accessory to see whether this works or not. If not try the following arrangement:

2	1	TX	to RX
3	2	RX	to TX
4	3	RTS	to CD
5	5	CTS	to RTS
4	7	Gnd	to Gnd

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(464)

Pacing yourself

Pace Micro Technology have at last produced a competitor to the WS4000, David Wallin examines the Linnet.

Pace's best known range of intelligent modems – The Series 4 – covers a spectrum of prices, from a couple of hundred pounds to over half a grand, but there is no really cheap model, capable of rivalling other manufacturers' modems such as the WS4000 and the AC1000. To fill this sub £160 price tag, the company has produced the Linnet.

Offering 1200/75, 75/1200 and 300/300 (V21 and V23) with the full (extended) UK Hayes command set, at the very least the modem has an impressive specification – and, I found, a performance to match.

Critics of the English language might ask how it is possible to have a 'full yet extended' Hayes command set. Well, a very brief explanation of Hayes is in order and will explain how this is possible.

Hayes was responsible for some of America's first modems. The company produced an internal language to make its use easier. This meant that by telling your comms software to go 'on-line' (send characters through the RS232 port) you could talk to the modem. Other command sets exist, but the Hayes is easily the most well-known and used worldwide.

The commands are in the format; AT (command) [Options]. AT means attention, the command is usually a single letter and the options are any extra bits to go with the command. For example, to dial Telecom Gold, the command is:

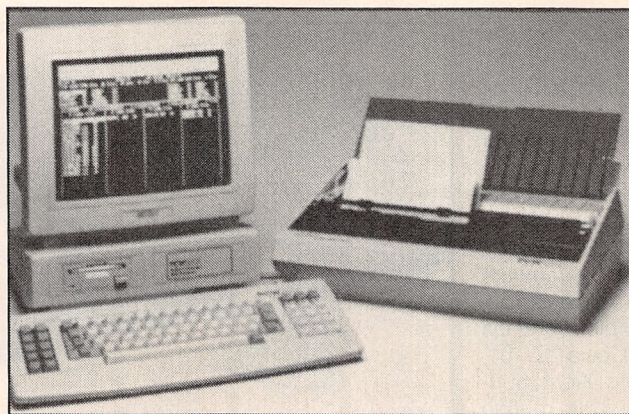
```
AT D P 01 583 1200
Attention Dial (Pulse) 01 583 1200
```

Hayes command set

The P is optional and tells the modem to use Pulse dialling rather than Tone (DTMF).

The command set was a revolution in the comms industry and gave a set of standard commands to talk to modems. However, in the USA, 1200/75 is about as common as 4800/4800 is in the UK. This is partly due to the fact that America is swarming with PCs, which due to their hardware, cannot handle split speeds such as 1200/75. The result was that the full Hayes command set omitted 1200/75 commands. The UK version has this and is therefore an extended version of the full set.

Auto dial and Auto answer are both standard on the Linnet, and the baud rate in use is automatically selected on connection to the other computer. The computer can 'talk' to the modem at a different speed to that which the modem is operating at, ie if



The Amstrad 8256, a perfect partner for the Pace Linnet

you are dialling Prestel at 1200/75 baud, your RS232/computer can be set to 300/300. Split speed buffering, allowing a computer which cannot operate at 1200/75 (ie, most PCs as stated above) to access viewdata systems, is fully supported.

As I know the UK Hayes command set pretty well, I decided to use the modem without reading much of the manual first. I checked the obvious things such as connecting the modem up (standard 25 way D connection to computer, mains lead supplied with transformer built into the plug), but not anything else. Firstly I loaded up ChitChat and went into 1200/1200 baud terminal mode. The modem responded absolutely fine, dialed correctly and logged onto the services dialed. Next I tried to use COMM+. This worked, but not quite as well as ChitChat – the reason is that my version of COMM+ is specially configured to work with a Voyager modem and not a Hayes one. However I still had a degree of success.

The next thing I tried was using the built-in Hayes autodial facility within ChitChat. Telecom Gold worked fine, as did Musical Plus, Musictel HQ, Prestel and a load of other services.

A 32-number store for commonly used phone numbers worked fine, and where Linnet scores far above its main rival, the WS4000, is in the fact that it is battery-backed. If you disconnect the modem or have a power cut or power is lost from any reason, then your list of numbers is not lost with it. On the WS4000, all your work would be lost and you would need to enter the entire list again.

The battery back up also applies to what are called S-registers. S-registers are a central part of the Hayes set and allow a

certain degree of modem customisation by the user.

Intelligent modem

One good thing about having an intelligent modem is that if you have a computer such as the 8256 where very cheap/free comms software is available you will not need to shell out up to £100 for good software. MAIL232 with a Linnet would make a good set up. Costing well under £150, it compares well with a manual modem and good software.

The modem is slim and attractively packaged in a cream coloured, plastic case, with a grey and blue front. Six red LEDs on the front indicate the status of power, on-line?, carrier detect, transmitting data?, receiving data? and carrier detected. Along with a small speaker, these enable you to monitor what's going on and I, like many, cannot stand using a modem without status LEDs.

Overall, I could find no problems with the modem. The manual is fair, but a small amount of extra information would be useful. At the price of £140 (+ VAT) it's good value, but with a current special offer it makes a great up-grade option. Pace is offering £50 trade-in value off the price if you return your current modem. Sending back your old modem, along with a cheque for £133.30 (inc. VAT) will buy you a Linnet.

Unfortunately, the offer is for a limited period so you'd better ring Pace first and check that the offer isn't over when you wish to order.

Product Linnet Modem **Price** £139 + VAT **Supplier** Pace Micro Technology, Allerton Road, Bradford, West Yorkshire BD15 7AG

Playing by numbers

Mark Jenkins looks at the possibilities of DIY MIDI programming.

We've had a couple of letters recently asking for more hints on DIY music programming, so you'll be glad to hear that Silica Shop is now making available a book on MIDI programming for the ST. Called *Atari ST: Introduction To MIDI Programming*, it's written by Len Dorfman and Dennis Young and is published by Abacus Software.

The book consists largely of software listings including simple send-receive routines written in C, more complex routines intended to play sounds on a Casio CZ-101, and a long listing taken from Xlent Software's *Music Box* program. This routine deals with all sorts of MIDI applications, plus routines for the internal sound chip.

Amstrad PC owners will be glad to hear that the trend towards cheaper IBM-compatible software is increasing, with several music packages now available in the UK. Music company Audio FX are now handling software in the Voyetra Technologies range of (Voyetra used to build an incredible rack-mounting MIDI synth but have now gone entirely into software development), and prices are now not too steep.

Sequencer software

The Voyetra packages are also theoretically available from Poke Limited on 0707 336724. They sell a complete hardware and software system including a PC1512 SDM and 16-track sequencer software for £840. Try phoning them - we did, but they weren't in (answer phones are really cheap now, guys).

Digidesign's *Soft Synth* range, which helps create synthesizer sounds on samplers such as the Ensonia Mirage, Prophet 2000 and Emulator, is now available on the Atari ST. UK importers haven't been announced yet but we'll keep you up to date.

We've recently been informed of the launch of a new company, Evenlode Soundworks, developed from those nice Steinberg people's import setup. The new company will handle several MIDI-related lines as well as Steinberg software; one of the most interesting of these is the *PPS* (Poor People's SMPTE) convertor from JL Cooper.

The unit doesn't use a conventional SMPTE time code but has many SMPTE-like abilities; it can lay a synchronisation code to tape, read it back to interpret a time code, and transmit both MIDI clocks and MIDI



The Atari ST, a powerful MIDI computer

song position pointers as a result.

This means the unit is capable of synchronising any micro-based MIDI sequencer which understands MIDI song position pointers to a multitrack tape machine. The advantage is that if you start the tape in the middle of a piece, the sequencer starts in the middle as well; much more satisfactory than having to wind back to the beginning of the piece every time you want to go for an overdub.

The PSS-1 unit would be ideal for adding these abilities to Iconix, Steinberg Pro-24 or similar sequencers, and we'll be reviewing it in full as soon as possible.

To be fair, it is possible to get a genuine SMPTE box for just £160 nowadays. It's called XR03 and comes from XRI, who used to specialise in Spectrum MIDI add-ons. They now have several stand-alone units, the XR03 offering 24, 25, 30 Drop Frame and 30 Frame Per Second SMPTE standards, MIDI Song Pointers and Clocks, 16 programmable tempo changes, merge of timing information and MIDI input, DIN sync for older drum machines and upgradeable EPROM software. Again, we'll be reviewing this one as soon as possible.

If you're based in the Midlands there are now a couple of specialist computer music software distributors around who could be of help. One of them is Sonyx in Stourbridge, which sells Steinberg and Hybrid Arts systems and is featuring Steinberg's new programmer/librarian for the Ensoniq ESQ-1 at £149. The company offers mail order facilities and their address is at the bottom of the page.

If you're still using the Commodore 64 and want one of the most power MIDI composi-

tion systems around you can get hold of a Jellinghaus Sequencer/Scorewriter in EPROM form from Syndromic Music. The system includes its own MIDI interface and of course avoids a lot of messing about with loading the software before each session.

The Pro 16 software allows you to record short patterns in real time or step time and edit them together into long chains of up to 16 simultaneous tracks. It's a highly flexible system and available for a one-off price of £75. If you're interest in writing your own MIDI software, Syndromic also has a couple of Jellinghaus Mini MIDI interfaces around at the silly price of £12.99.

Syndromic Music, 24-26 Avenue Mews, Muswell Hill, London NW2. Tel: 01-444 9126.

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If you have any queries or tips for this column, please write to Mark Jenkins at *Popular Computing Weekly*, Greencoat House, Francis Street, London SW1P 1DG. Mark would also welcome examples of your own music on audio or program tape, or disc.

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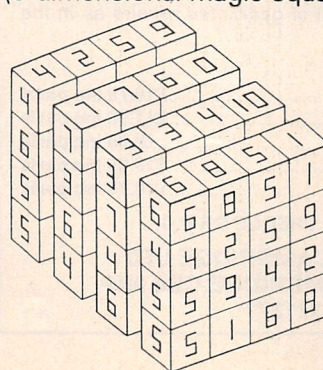
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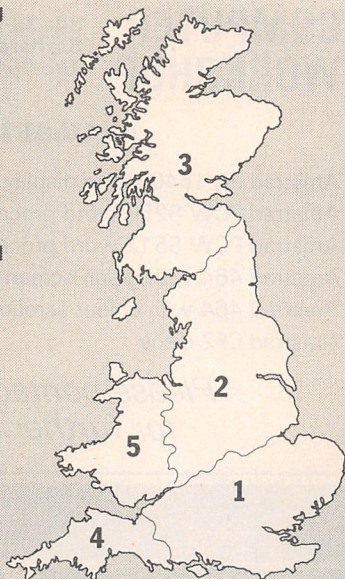
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

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Sidewize towards the future

This is definitely the sort of game that cries out for an infinite lives poke.

Ever since FTL breathed a bit of life back into the old-fashioned shoot 'em up with *Lightforce*, there's been a whole slew of zap games swarming back into the shops. Hewson's *Exolon* seemed to have settled the debate about the best shoot 'em up for a while, then all of a sudden *Sidewize* appears.

Like all the best shoot 'em ups, *Sidewize* is very simple to play, with just up/down, left/right, and fire controls to master, but actually mastering the game and getting anywhere near completing it is a take that will take ages to complete.

The plot includes all the usual stuff about wars between alien races, and how it's up to you to singlehandedly go off into space and save the day by wiping out anything that moves.

What this translates into on the screen is a small figure in a space suit, armed with a gun, floating against a starry background. Then, before you can draw breath the waves of aliens start to move in on you. Actually, rather than waves, you tend to get just one alien at a time but they're not easy to deal with.

Some of these are composite creatures, lots of small aliens joined together to make one large one. They're a bit tricky to deal with, because as well as being deadly they're large enough to take up a lot of space on screen, which then makes it difficult for you to manoeuvre. They move around the screen in different formations, but after a while you should get the hang of dodging some of them.

At the start of the game you

are given a choice between starting on one of four worlds – Omicron, Nu, Delta, or Iota – though to complete the game you do have to get through all four one way or another. Whatever your choice, you will have to go through a sequence in outer space before you arrive on the planet itself.

There are similarities between the four worlds, but they still add a greater element

in *Exolon*).

To begin with you're not in a very strong position; you move quite slowly and your gun fires just single shells (which puts you at a disadvantage against some of the aliens who require more than one shot to destroy them). But as you progress into the game finishing off certain waves of aliens allows you to pick up additional abilities and firepower.



of variety to the game than if you simply had to go repeatedly through a fixed sequence of screens (which is the only flaw

There are lasers to be collected, anti-matter guns, and a 'multiple fire' option which shoots a number of shells simul-

taneously at different angles, allowing you to pick off some of the larger attack waves.

You can also gain greater speed, force fields, and additional lives. You'll definitely need the additional lives, because it took me hours of practice before I even managed to get past the initial outer space sequence. Things don't get any easier on the planet surface either, and when you do get to the end of each world you come up against one last mega-baddy who is completely deadly.

Sidewize is certainly the most difficult shoot 'em up I've played for a long time. In fact it comes close to being so hard that I was almost tempted to give up in frustration. Fortunately, the game itself is so simple to play that you can't really walk away from it without giving it one more go, or trying one of the other planets.

Like the rest of the game, the graphics are simple but effective. The programmers have stuck to single colours against a black background, avoiding attribute problems and keeping things nice and clear. The sound effects are mildly disgusting, but effective in a flatulent sort of way.

Despite the game's difficulty there's no need to be too intimidated, just stick with it for a few games and you'll soon be hooked along with all the rest of us.

Cliff Joseph

"You can't really walk away from it without giving it one more go"

Program *Sidewize* **Type** Arcade **Micro** Spectrum
Price £7.95 **Supplier** Firebird, 64-76 New Oxford Street, London WC1A 1PS.

Your complete guide to all the software released this week

Amstrad CPCs

Program Professional Skiing Simulator Type Simulation **Price** £1.99 **Supplier** Codemasters, 1 Beaumont Business Centre, Beaumont Close, Banbury, Oxon.

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Program Renegade Type Arcade **Price** £8.95 (tape), £14.95 (disc) **Supplier** Imagine, 6 Central Street, Manchester M2 5NS.

See panel for review.

Program Survivor Type Arcade **Price** £9.99 (tape), £14.99 (disc) **Supplier** US Gold, Units 2/3, Holford Way, Holford, Birmingham B6 7AX.

The graphics are a bit on the blocky side, but I think this version is a bit of an improvement on the Spectrum one.

Program World Class Leaderboard Type Simulation **Price** £9.99 on cassette **Supplier** US Gold, Units 2/3, Holford Way, Holford, Birmingham B6 7AX.

There can't be many more possible versions of this to come. If you haven't already got it, and you're looking for a good golf game for your machine then look no further.

Program Dizzy Type Arcade **Price** £1.99 **Supplier** Codemasters, 1 Beaumont Business Centre, Beaumont Close, Banbury, Oxon.

Program Transmuter Type Arcade **Price** £1.99 **Supplier** Codemasters, 1 Beaumont Business Centre, Beaumont Close, Banbury, Oxon.

An excellent budget shoot 'em up, already a hit in its Spectrum and C64 versions, and well worth looking at.



Atari ST

Program Tai-Pan Type Arcade **Price** £19.95 **Supplier** Ocean, 6 Central Street, Manchester M2 5NS.



Program Skulldiggery Type Arcade **Price** £19.95 **Supplier** Nexus, DSB House, 30 High Street, Beckenham, Kent BR3 1AY.

Boulderdash for the ST. A good enough version, but where are the mega-games that the machine deserves?

Commodore 64

Program Tai-Pan Type Arcade **Price** £8.95 (tape), £12.95 (disc) **Supplier** Ocean, 6 Central Street, Manchester M2 5NS.



Program Tunnel Vision Type Arcade **Price** £2.99 **Supplier** Rack-It, 8-10 Paul Street, London EC2A 4JH.

Program Anarchy Type Arcade **Price** £2.99 **Supplier** Rack-It, 8-10 Paul Street, London EC2A 4JH.

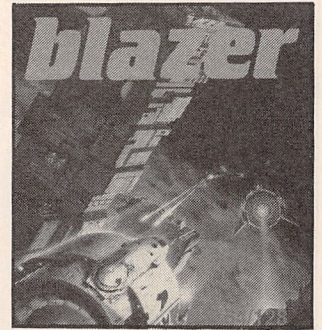
A promising start to Hewson's budget range. *Anarchy* is a combination shoot 'em up/maze game that's simple but very addictive. The sort of game that gives your joystick cramp.

Program Water Polo Type Arcade **Price** £9.99 (tape), £14.99 (disc) **Supplier** Gremlin Graphics, Alpha

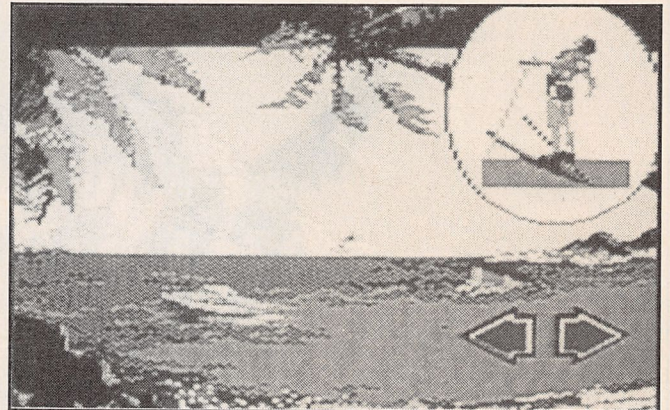
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Program Blazer Type Arcade **Price** £9.95 (tape), £12.95 (disc) **Supplier** Nexus, DSB House, 30 High Street, Beckenham, Kent BR3 1AY.

After a couple of nice releases from Nexus, *Blazer* turned out to be a disappointingly average Lightforce style shoot 'em up. Not a bad game, but not as good as I was hoping for.



continued on page 45 ▶



I could be wrong, but as far as I know this is the first water-skiing simulation for a home computer (no prizes for proving me wrong, so don't bother writing in), so at least the game gets good marks for originality.

I can't vouch for the authenticity of the game, since my aquatic activities don't go beyond sipping cold drinks whilst reclining on a lilo, but Infogrames seem to have done a fairly good job with it.

You are put in control of a skier (supposed to represent French skiing star Patrice Martin). The game offers three events – the slalom, jumping, and freestyle – and the screen display differs slightly for each. On the slalom you get a view from just behind the skier, with the boat in front of you and the slalom markers moving towards you. This part is relatively simple, and the slalom doesn't actually last that long so you'll soon find yourself going on to another event.

Jumping is divided into two parts. There is the approach to the jump, during which you need only accelerate, and as long as you don't do anything daft you go straight to the jump itself. Here the view changes to give you an angled view of the ramp in the water, and your skier only comes into the picture as he arrives near the base of the ramp. At this point you have to balance the left/right controls to control the jump, and a close-up picture in the top left corner of the screen shows your landing.

The freestyle event gives you a view of the skier from the back of the boat, and you have to put together a series of turns and various other movements and try to rack up a high score for the complexity of the movements. This might not have been the best of events for the programmers to pick, because as there is no single goal to achieve in the event there's not much to focus your attention on. As a result, simply stringing together a series of twists and turns may not prove to be a very addictive pastime for very long.

The graphics are good throughout, and the skier responds well to joystick/keyboard control. I can't help thinking that there could be a little more in the way of content in the game, but it does offer options for up to three players which adds a competitive edge to the action.

Stephen Dean

Program Championship Water-Skiing Type Simulation **Micro** Amstrad CPCs **Price** £0.00 **Supplier** Infogrames, Mitre House, Abbey Road, Enfield, Middlesex EN1 2RQ.



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◀ continued on from page 43

Program Special Agent Type Arcade **Price** £1.99 **Supplier** Firebird, 64-76 New Oxford Street, London WC1A 1PS.

Program Solomon's Key Type Arcade **Price** £8.99 **Supplier** US Gold, Units 2/3, Holford Way, Holford, Birmingham B6 7AX.



Electron/BBC/ Master

Program The Living Daylights Type Arcade **Price** £9.95 **Supplier** Domark, Domark House, 22 Hartfield Road, Wimbledon SW19 3TA.

Program Time Warriors Type Adventure **Price** £4.95 (disc) **Supplier** Ernie Scrubble's Workshop, 14 Essex Street, Middlesbrough, Cleveland TS1 4PS.

I don't really know how to describe this. One side of the disc has a six-adventures-in-one game called *Time Warriors*, whilst on the other side is a second adventure, *The Day That Megawack The Magician Saved The Beautiful Princess Daphne From The Evil Old Dragon*. Make of all this what you will.



Program Palace of Magic Type Arcade **Price** £9.95 Electron cassette (£11.95 on 5.25" disc, £14.95 on 3.5" disc), £9.95 BBC cassette (£11.95 on disc), £14.95 Master disc **Supplier** Superior Software, Regent House, Skinner Lane, Leeds LS7 1AX.

Enjoyable arcade game, set in a large palace where you are searching for a hidden teleport machine. It's not as action packed as the Stryker games, but the layout of the palace is more complex, giving it a bit more variety.

Program Puzzles Type Puzzle **Price** £5.00 BBC/Electron cassette (£7.00 BBC B and Master disc versions) **Supplier** NRG Software, 30 Quarry Street, Johnstone, Renfrewshire PA5 8DZ.

IBM PC and Compatibles

Program PC Christmas Time Type Arcade **Price** £9.95 **Supplier** G & M Software, Echline Place, South Queensferry, West Lothian EH30 9XB.

Would you believe an Advent calendar for your PC? Aimed at children (presumably upgrading to PCs from their Spectrums), the disc also contains a number of games, a story, and a letter to Santa.

Spectrum

Program Tai-Pan Type Arcade **Price** £7.95 **Supplier** Ocean, 6 Central Street, Manchester M2 5NS.

Good heavens, it's been previewed to death over the last few months but as of this week *Tai-Pan* is officially on release. For comment, see just about any home computer mag that's been published in the last six months.

Program Grand Prix Simulator Type Arcade **Price** £1.99 **Supplier** Codemasters, 1 Beaumont Business Centre, Beaumont Close, Banbury, Oxon.

Apparently selling by the bucket load on the Amstrad medium, and with CCL coming soon this is Codemasters' latest bid for the No. 1 slot in the charts.

Program Fruit Machine Simulator Type Simulation **Price** £1.99 **Supplier** Codemasters, 1 Beaumont Business Centre, Beaumont Close, Banbury, Oxon.

Not another fruit machine game, you all cry. But this one at least has a two player option to spice it up a bit since you can't win any money on it.

Program Ocean Conqueror Type Arcade **Price** £2.99 **Supplier** Rack-It, 8-10 Paul Street, London EC2A 4JH.

Program Draughts Genius Type Boardgame **Price** £2.99 **Supplier** Rack-It, 8-10 Paul Street, London EC2A 4JH.

Not exactly a Rambo, fast-action game, but it's been nicely implemented and it's the only draughts game that I've ever lost to.

Program Enduro Type Arcade **Price** £1.99 **Supplier** Firebird, 64-76 New Oxford Street, London WC1A 1PS.

Program ATV Simulator Type Arcade **Price** £1.99 **Supplier** Code-

masters, 1 Beaumont Business Centre, Beaumont Close, Banbury, Oxon.

No, not a TV simulator, but an 'All Terrain Vehicle' game. This is basically a souped up Landrover going hell for leather across some extremely rough roadworks.

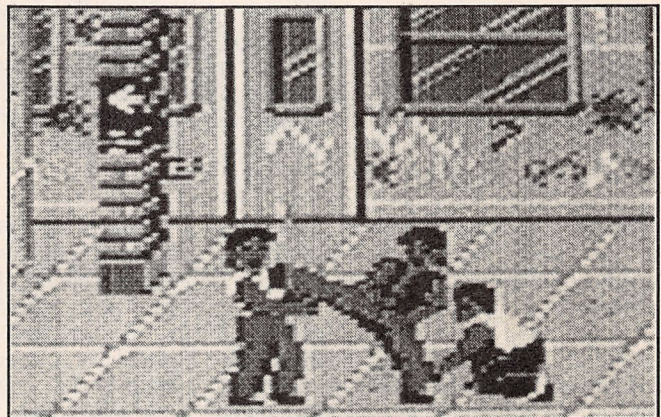
Program Renegade Type Arcade **Price** £7.95 **Supplier** Imagine, 6 Central Street, Manchester M2 5NS.

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Program Solomon's Key Type Arcade **Price** £8.99 **Supplier** US Gold, Units 2/3, Holford Way, Holford, Birmingham B6 7AX.



Another coin-op conversion trundles off the Imagine conveyor belt with the release of *Renegade*.

This is another martial arts combat game, but with a little bit of a difference. Instead of being armed with a bewildering array of different movements and playing against a single opponent, in *Renegade* you are up against whole gangs who must be tackled all at once.

This game is set in what looks like the streets of New York, where your character, *Renegade*, is on his way to meet his girlfriend, Lucy. He travels by subway, and as he arrives at his station is met by a street gang. You have to fight the gang and then set off through five sequences, each with its own gang, before you can meet Lucy.

The five sequences are the Subway, Pier, Sleazy St, End St and Interior. The gangs that you will face include cyclists, and Hell's Angels, Big Bad Bertha and her female gang, and a variety of thugs armed with knives and guns.

Each gang has a leader, but before you can take on the leader you will have to beat most of the members of each gang. If you don't beat the gang leader within the time limit you'll lose a life.

So far, so good. Because of the number of opponents that you're up against the mechanics of the combat system are simpler than in most martial arts games. You've got just five attacking moves that you can use; punch, a couple of kicks, a knee in the groin, and sitting on top of a floored opponent while you punch his head in.

The only problem here is that control of these movements is divided between the joystick and three keys on the computer, and I found that only having two hands was a distinct disadvantage here. The instructions aren't as clear as they could be either (though hopefully they can be tidied up before the game gets into the shops).

I like the idea of having to take on several opponents at a time, as it gives the game an edge that's sometimes lacking in one-on-one combat games, but *Renegade* doesn't quite give you the smoothness and speed of response that is required to pull it off.

Cliff Joesph

Program Renegade Type Arcade **Micro** C64 **Price** £8.95 tape, £12.95 disc **Supplier** Imagine, 6 Central Street, Manchester M2 5NS.

French Lessons?

On the long trek to the sun this summer, I escaped shopping on a few occasions to browse through the magazines in the hypermarket news kiosks. There were fewer computer magazines on display than you'd find in Britain – half a dozen, I found – a few Amstrad mags, and the rest covering the full range of machines, either business or domestic.

The mass readership market for computer magazines appears not to be so broad in France as in the UK. Just think of the range carried by most decent shops here. Missing also were the racks of budget computer games in the newsagents that we're growing accustomed to. What I found in one small country village bookshop in Provence, however, was a copy of the Minitel directory, an inch and a half thick.

Intriguing.

I'm not very clued up on Minitel, but apparently a few years ago some French government telecommunications whizzkid thought it a good idea to give away dedicated keyboard terminals and VDUs to phone owners. Using these, you interrogate the database that holds the national telephone directory instead of thumbing through a dog-eared ancient volume that covers a fraction of the country. Just think how many trees that saves in unused paper!

How about the Minitel directory, then? Well, Minitel gives access to a variety of databases and bulletin boards. The directory describes what's on offer, apart from phone numbers, including news services, shopping, banking, tourism, travel. Even some churches advertise their activities.

The directory gives a brief account of contents, including coded symbols that speed up one's search through the printed word, to find the call-up number of the service you want. Many entries include a symbol which indicates that games are on offer, for downloading and playing on your terminal.

In a remote village above the vineyards of Alsace, on the way home, we stayed at a small municipal campsite. On the office desk I saw my first Minitel terminal. Never had my French been pushed to such limits as I sought to engage the camp warden in conversation about this new toy. Quite useful, he agreed, for phone numbers, but expensive if you wanted to play games. He quoted the hearsay figure of one franc a minute. He reckoned that people with money found it a great asset for keeping kids amused during vacations. Better than a home micro?

Judging by the recent growth of the home computer market in France, gamers are getting bored with Minitel offerings. They are becoming more prepared to pay for new hardware and for good software, having acquired the taste. But it's paradoxical if you think about it.

Here in Britain, where home computers are more common, we must invest a small fortune in hardware and software to access socially useful data, often available free somewhere in print if you're able to hunt for it. In France much of this information is available free, or at minimal cost through Minitel.

In Britain, if you have a micro to start with, game playing is relatively cheap and varied – hardly a franc a minute unless you're a MUG addict.

The popular uses of modern technology in the two countries reflects different priorities. The French way emphasises the need for national cohesion in making available useful information. The British way, so far, goes mainly for cheap mass market fun, rather than extending the availability of electronic information services to more people.

Free modems for British home computer users would be a less expensive start than Minitel. What new enterprise might be stimulated as a result?

Keith Kimber

Puzzle No 275

"Did you know" announced Professor Otto Hex to some of his students, "that the current year, 1987, has an interesting property. If I were to multiply 1987 by a certain number, the product would consist entirely of 1's."

So saying, he wrote a representation of this sum on the board:

$$1987 \times ? = 1111111111 \dots$$

The dots indicate that the 1's continue for some time.

"What I would like you to do," continued the professor, "is to determine just how many 1's I would have in the smallest possible answer."

Most of his students were stumped! Can you do better?

Solution to Puzzle No 270

The numbers were 1467, 6174 and 7641. The three numbers consist of the same digits, the third is the sum of the other two, and in no two numbers does the same digit appear in the same position.

The program used two arrays, one D() to store the four digits being tested at a time, and N() the ten different arrangements possible with these four digits. Normally, there would be 24 different permutations of four digits (4x3x2x1), but as the question specifically prevents a digit appearing in the same position in more than one number, this is reduced to 10. The relative orders of the digits are shown in the DATA lines (1000 and 1010).

```
10 DIM D(4),N(10)
20 FOR A=0 TO 9:D(1)=A
30 FOR B=A TO 9:D(2)=B
40 FOR C=B TO 9:D(3)=C
50 FOR D=C TO 9:D(4)=D
60 RESTORE
70 FOR M=1 TO 10:READ X$
80 P=VAL(MID$(X$,1,1)):D=VAL(MID$(X$,2,1))
90 R=VAL(MID$(X$,3,1)):S=VAL(MID$(X$,4,1))
100 N(M)=D(P)*1000+D(D)*100+D(R)*10+D(S)
110 NEXT M
120 FOR TEST=2 TO 10
130 SUM=N(1)+N(TEST)
140 IF SUM=N(1) OR SUM=N(TEST) THEN 220
150 A$=STR$(N(1)):B$=STR$(SUM)
160 FOR Y=1 TO 4:FOR Z=1 TO 4
170 IF MID$(A$,Y,1)<>MID$(B$,Z,1) THEN 200
180 B$=LEFT$(B$,Z-1)+MID$(B$,Z+1)
190 Z=4
200 NEXT Z:NEXT Y
210 IF B$="" THEN PRINT N(1); " ";N(TEST); " ";SUM
220 NEXT TEST
230 NEXT D:NEXT C:NEXT B:NEXT A
1000 DATA 1234,2143,3142,4123,4312
1010 DATA 4321,2341,2413,3412,3421
```

Winner of Puzzle No 270

This week's winner is Les Cooper, of Blackpool, Lancs, who will receive £10.

Rules

The closing date for Puzzle 275 is October 7th.

HACKERS



PROGRAMMERS

We have a number of new games currently at the design stage of production.

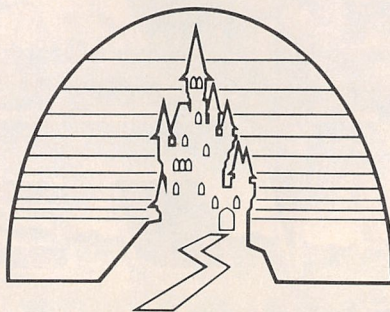
Due to our increased production schedule and plans to release our games across a broader range of machines we are looking for further programmers to join the Palace Team.

We are looking for programmers with proven knowledge of the IBM PC, Amiga, Atari ST, Commodore 64, Spectrum or Amstrad CPC. You will need to live within the London area and able to work at home.

If you join us you will be working alongside a design team consisting of some of the best artists, programmers and sound people in the business.

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